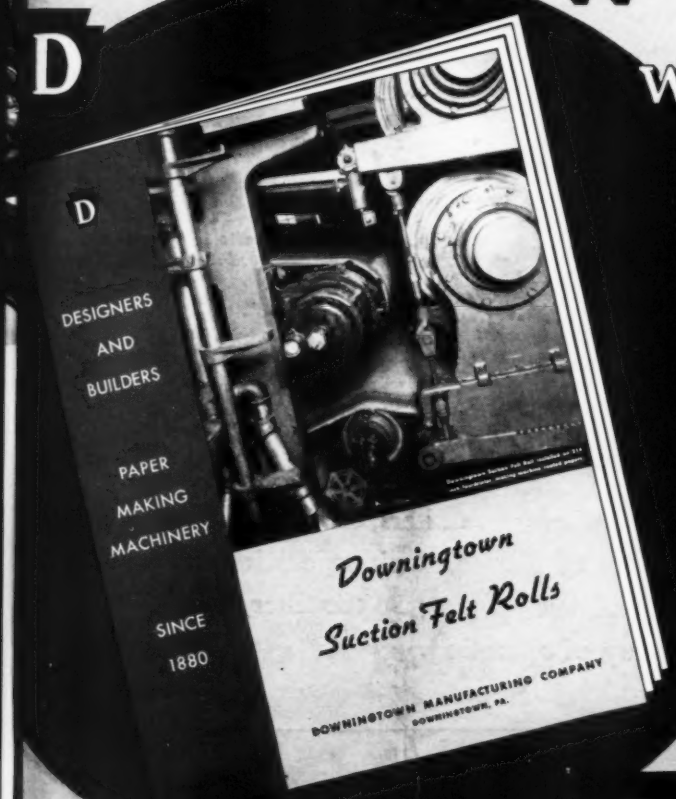
THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—JULY, 1946

JUL 29 1946
DETROIT

D

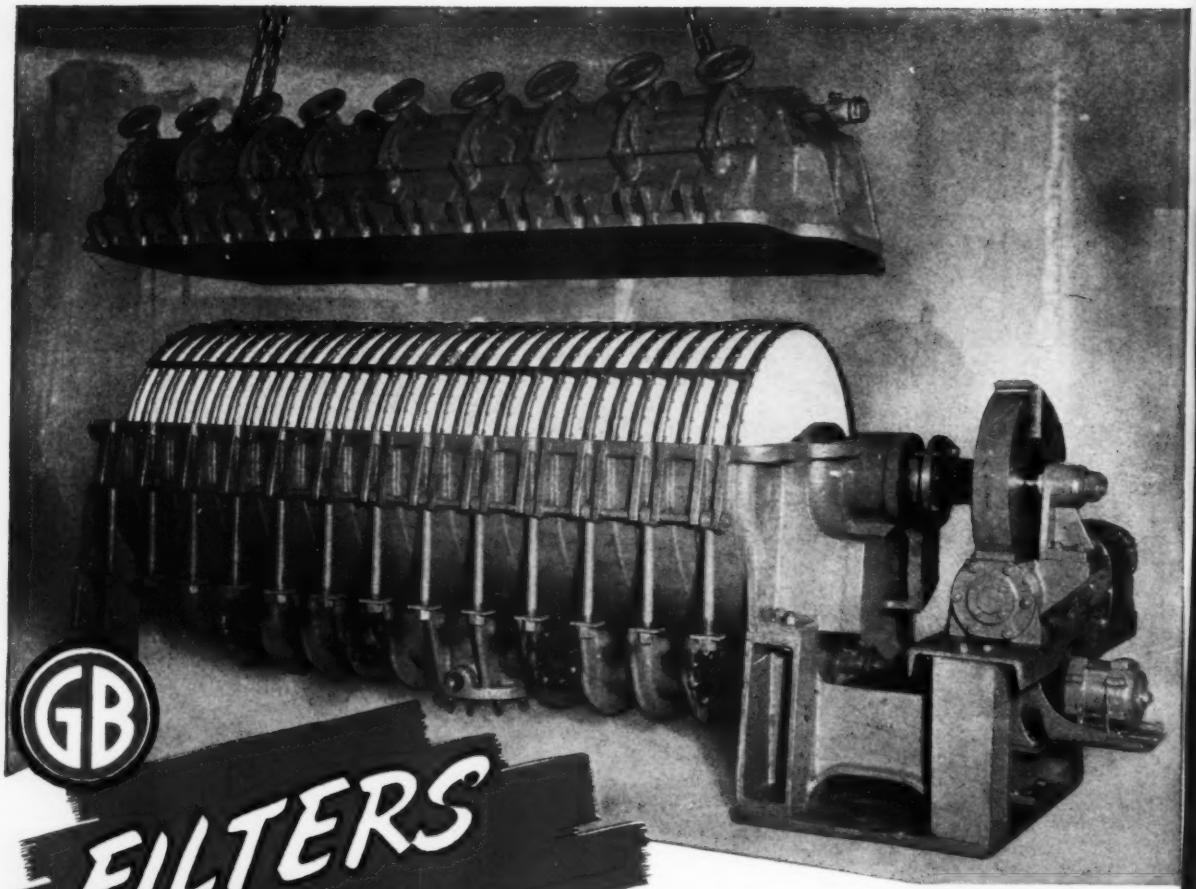


NEW CATALOG

WRITE FOR A COPY

Well over 200 Downingtown Suction Felt Rolls are now operating on Fourdrinier and Board Machines. This new catalog No. 1145 tells all about them. Better write for it today, for with so many in use, you may be missing a "money saver", if you fail to investigate. Downingtown Manufacturing Company, Downingtown, Penna.

DOWNINGTOWN
Designers & Builders
Paper Making Machinery



GB FILTERS

Vallez Filter with top half lifted showing leaf element.

"Standards of Equipment Since 1916"

VALLEZ FILTERS are rotating leaf pressure filters, distinguished for closed cycle operation, clarity of filtrate, washing efficiency, sluicing or dry cake discharge without opening up the filter, and finally, for their over-all economy of operation.

GOSLIN-BIRMINGHAM MANUFACTURING CO., INC.

BIRMINGHAM ALABAMA

350 MADISON AVE NEW YORK

CHICAGO SAN FRANCISCO NEW ORLEANS SEATTLE

Not a flaw in a carload . . .

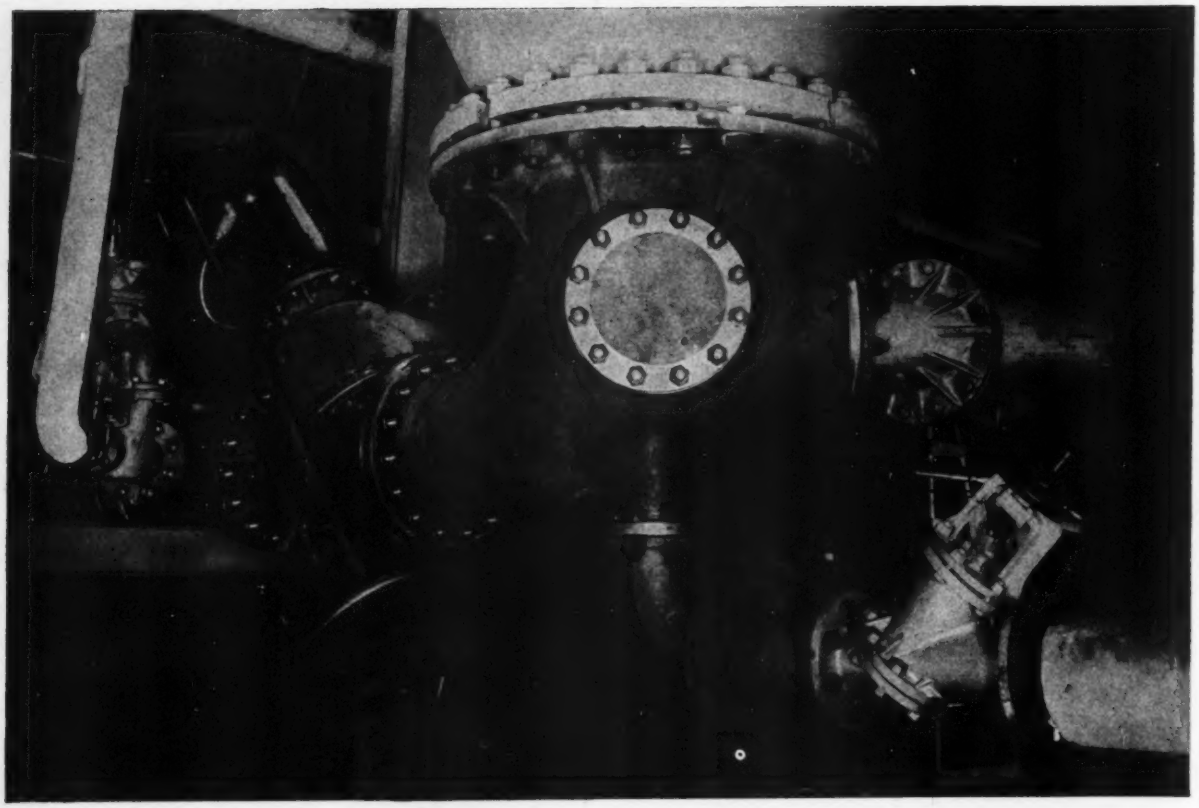
Felt rolls for high-speed Beloit machines require utmost precision in manufacture . . . meticulous machining to fit with roller bearings. Flawless, 'round-the-clock operation of these rolls results from the craftsmanship that starts with design and ends with balancing. The kind of craftsmanship that has been practiced at Beloit ever since its founding in 1858. *Beloit Iron Works, Beloit, Wisconsin.*

BELOIT

PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

WHEN YOU BUY BELOIT...YOU BUY MORE THAN A MACHINE!



ESCO

BLOW FITTINGS and BLOW VALVES

for less maintenance and better color...

THERE IS AN EFFECTIVE ANSWER to the daily beating given blow fittings and blow valves—and a good way to stop high maintenance costs and discolored pulp.

The answer is *ESCO* stainless steel blow fittings and blow valves. They are built to resist corrosion, heat, pressure, abrasion, shock and vibration. In doing this they reduce shutdowns and maintenance costs to a minimum, assure cleaner, whiter pulp.

ESCO engineers for years have worked closely with pulp mills in all parts of the country. *ESCO* blow fittings and blow valves are designed in the light of this experience.

Both are cast in *ESCO* alloy 45 stainless steel. The blow valves and fittings are accurately machined, hydrostatically tested and rigidly inspected.

It will be profitable for you to get complete data on *ESCO* blow fittings and blow valves as well as other *ESCO* stainless steel specialties for pulp mills. Ask your nearest *ESCO* representative or write us for information and for Bulletins 155 and 157.

ELECTRIC STEEL FOUNDRY

STAINLESS STEEL FOR ULTIMATE ECONOMY

2141 N. W. 25th AVENUE, PORTLAND 10, OREGON

OFFICES AND WAREHOUSES

SEATTLE, 4	HONOLULU, 5	NEW YORK, 17	SAN FRANCISCO, 7	SPOKANE, 8	LOS ANGELES, 11	CHICAGO, 1
2724 First Ave. S.	814 Kapiolani Blvd.	Graybar Building	699 Second Street	121 S. Monroe St.	4600 Pacific Blvd.	221 N. La Salle St.
Elliott 4161	Phone 6486	Lexington 28958	Douglas 8346	Main 5530	Lucas 7251	Dearborn 2284

EUGENE, ORE.
1991 Sixth Ave., W. • Phone 5012

IN CANADA—*ESCO* LIMITED, 1084 Homer St., Vancouver, B.C. Telephone Marine 2343

FOR SALE

PAPER MILL PROPERTY
WITH HYDRO-ELECTRIC POWER
AT HERKIMER, NEW YORK

Process Steam and Water; Railroad Siding; Partially Utilized by Packing Products (molded pulp) Business.

9 ADVANTAGES

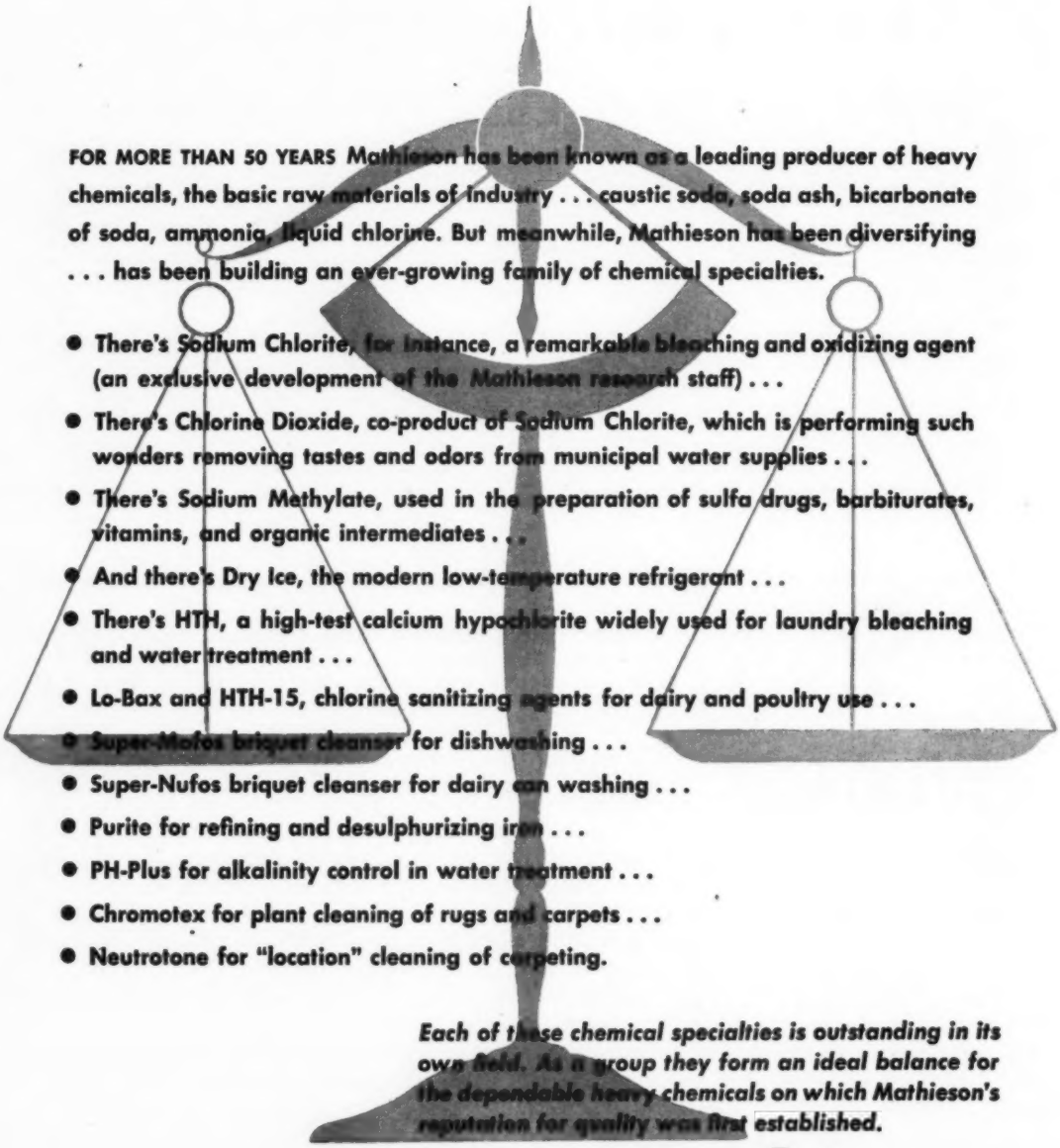
- **LOCATION.** In the Mohawk Valley, 80 miles west of Albany, 220 miles from New York City. On the main line of the New York Central R.R.
- **BUILDINGS.** Comprising in area 75,000 sq. ft. All are sprinkled. Low fire insurance. Practically all equipped with heating coils or unit heaters. Buildings now idle originally built for two paper machines and beaters.
- **EQUIPMENT** consists of machinery for the manufacture of molded pulp packing articles including egg cartons, radio tube pads, etc.
- **PROFITABLE BUSINESS** which has run at near capacity for many years. Sale price includes all land, buildings, water power rights, equipment, good will and all trade marks, patents, licenses and radio contracts necessary to the operation of the molded pulp plant.
- **POWER.** Concrete dam with head at mill of 20'. 42" S. Morgan Smith Twin Turbine Water Wheel — a 375 KW Wood System 550 Volt 60 cycle AC generator develops app. 500 HP. Enough water available for another 500 HP.
- **STEAM.** Two 150 HP Babcock and Wilcox water tube boilers rated for 125 lbs. and a brick chimney and hood, app. 125' high.
- **SPUR TRACKS** of the New York Central Railroad adjoin the buildings.
- **WATER.** Process water available with a 12" supply line from canal into mill.
- **LABOR.** Adequate supply of skilled and unskilled, both male and female. Labor relations are of the best.

WRITE FOR COMPLETE FOLDER

HERKIMER PROPERTIES, Inc.

c/o Morley Co., Portsmouth, N.H.

CHEMICAL BALANCE



FOR MORE THAN 50 YEARS Mathieson has been known as a leading producer of heavy chemicals, the basic raw materials of industry . . . caustic soda, soda ash, bicarbonate of soda, ammonia, liquid chlorine. But meanwhile, Mathieson has been diversifying . . . has been building an ever-growing family of chemical specialties.

- There's Sodium Chlorite, for instance, a remarkable bleaching and oxidizing agent (an exclusive development of the Mathieson research staff) . . .
- There's Chlorine Dioxide, co-product of Sodium Chlorite, which is performing such wonders removing tastes and odors from municipal water supplies . . .
- There's Sodium Methylate, used in the preparation of sulfa drugs, barbiturates, vitamins, and organic intermediates . . .
- And there's Dry Ice, the modern low-temperature refrigerant . . .
- There's HTH, a high-test calcium hypochlorite widely used for laundry bleaching and water treatment . . .
- Lo-Bax and HTH-15, chlorine sanitizing agents for dairy and poultry use . . .
- Super-Nufos briquet cleanser for dishwashing . . .
- Super-Nufos briquet cleanser for dairy can washing . . .
- Purite for refining and desulphurizing iron . . .
- PH-Plus for alkalinity control in water treatment . . .
- Chromotex for plant cleaning of rugs and carpets . . .
- Neutrotone for "location" cleaning of carpeting.

Each of these chemical specialties is outstanding in its own field. As a group they form an ideal balance for the dependable heavy chemicals on which Mathieson's reputation for quality was first established.

Mathieson
CHEMICALS

THE MATHIESON ALKALI WORKS (Inc.)
60 E. 42nd St., New York 17, N. Y.

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U.S. Pat. Off.)

VOLUME 28 | JULY, 1946 | NUMBER 4

—FEATURES—

You Need Job Evaluation	Norman Pratt	523
Pulpwood Volume Measured by Water Displacement		527
Pulp Bleaching	L. E. Russell	528
Activated Silica Sol in Water Treatment	F. Robert MacGonagle	533
B.T.U. in the Paper Industry	George R. Wadleigh	535
Bulk Density Factor Nomograph	D. S. Davis	538
Superintendents Association Meets for Third Time at Poland Spring		540
Convention Papers . . . Abridged		564

—NEWS—

A Natural Phenomenon	474	Safety	551
Trade Winds	475	Names in the News	552
Associations	540	Personals	552
Allied	550	Necrology	558

—DEPARTMENTS—

Editorial	497	New Equipment and Supplies	588
Current Thought	498	Technical Developments	592
Paper Sketches	539	Papermaking Patents	594
Coming Events	548	New Publications	596
Safety Scores	551	Current Market Quotations	598
Practical Shorts	561	Index to Advertisers	601

Published monthly by **FRITZ PUBLICATIONS, INC., 59 East Van Buren Street, Chicago 5, Illinois**

EDWARD B. FRITZ Founder	A. SCOTT DOWD President and Gen. Mgr.	HARRY E. WESTON Editorial Director
A. C. BRUCE Secretary	EDGAR C. FARREN Production Manager	BESSE MERRITHEW Editor
A. C. L. FRITZ Vice Pres. and Treas.	G. E. VON ROSEN Circulation Director	C. J. ELWELL Circulation Field Rep.

ADVERTISING REPRESENTATIVES

New York • RAYMOND S. VAN NYDECK • 9 Rockefeller Plaza • Circle 7-3085 • New York 20, N. Y.
Boston • MEADE AND COMPANY • 403 Statler Building • Liberty 9677 • Boston 16, Mass.
Cleveland • L. M. PERKINS • 3277 DeSota Ave. • Yellowstone 6504 • Cleveland Heights 18, Ohio
Chicago • JOHN D. HENDERSON • 59 E. Van Buren Street • Wabash 3543 • Chicago 5, Illinois
San Francisco • NOURSE ASSOCIATES • 582 Market Street • Exbrook 7247 • San Francisco 4, Calif.
Los Angeles • NOURSE ASSOCIATES • 412 West 6th Street • Vandike 5875 • Los Angeles 14, Calif.

THE PAPER INDUSTRY and PAPER WORLD is indexed regularly in "The Industrial Arts Index." An index to each volume is issued annually by the publisher as Section Two of the April number.

Copyright 1946 by Fritz Publications, Inc.

Member:
Audit Bureau of Circulations
Associated Business Papers, Inc.

Entered as second class matter June 29, 1938, at the post office at Chicago, Ill., under the Act of March 3, 1879. Subscriptions in the United States, U. S. Possessions, Canada, Cuba and Mexico, $2.00 for one year, $3.00 for two years. All other countries $3.00 for one year, $5.00 for two years.

Reduce Losses from Slime with Hooker Chlorine

ARE your operations halted from time to time by "slime" clean up? Is efficiency of your heat transfer lowered because of slime growths and deposits in condenser tubes? There is no need to put up with costly "slime" when you have Hooker Liquid Chlorine available.

The use of chlorine to maintain freedom from decay-producing biological growth in pipe interiors, vat corners, and walls as well as in condenser water is paying off in many pulp and paper mills. Besides producing economies in lower operational costs, chlorination results in a cleaner product.

With the use of chlorine in the water, a more nearly "closed system" is possible, with the re-use of white water and consequent savings from reductions in heat input and material requisite in make up.

You who are using Hooker Chlorine in the preparation of bleach liquor know that you can depend on its consistently uniform high purity. Extend its usefulness and value to you in slime control. Hooker's Technical Staff is ready to help you in the application of chlorine and the other Hooker Chemicals to your particular operations.

A request on your company letterhead will bring you a copy of the "Hooker Liquid Chlorine" Booklet that contains information that will help you. Send for copy.

HOOKER ELECTROCHEMICAL COMPANY

8 Union Street Niagara Falls, New York

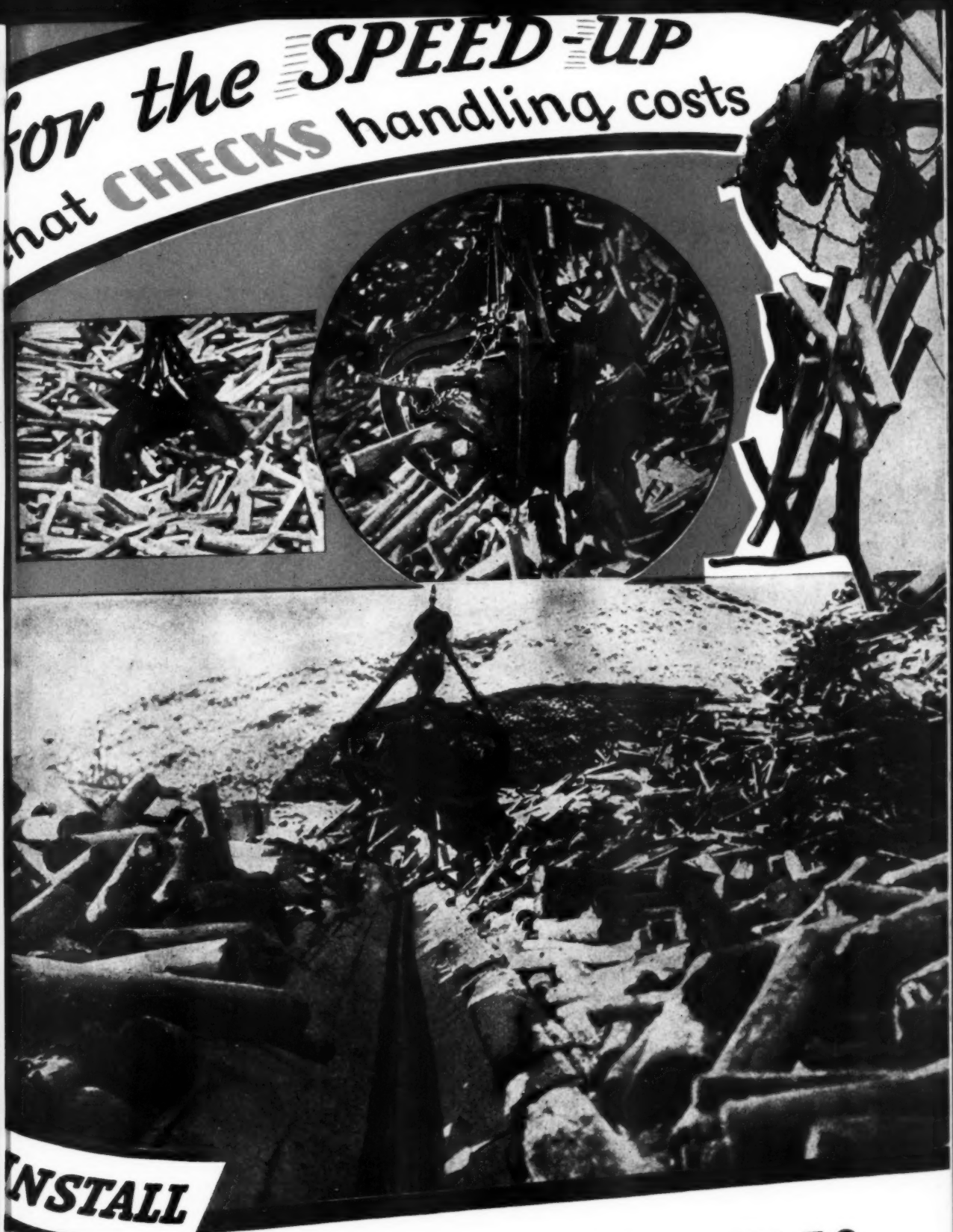
New York, N. Y. · Wilmington, Calif.

Tacoma, Wash.

HOOKER CHEMICALS

CAUSTIC SODA CHLORINE MURIATIC ACID SODIUM SULFIDE 2986

for the SPEED-UP that CHECKS handling costs



INSTALL

OWEN PULPWOOD GRAPPLES

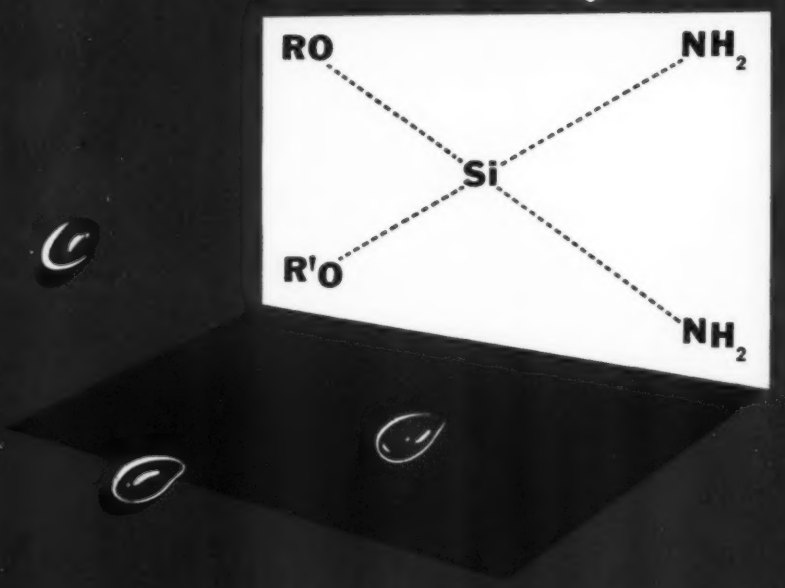
The OWEN BUCKET CO
5201 BREAKWATER AVENUE, CLEVELAND, OHIO

New York, Philadelphia, Chicago, Berkeley, Cal.

Introducing Amino Silanes...

"SYLON"

MADE BY 3M COMPANY



AS A WATER-REPELLENT FOR PAPER, TEXTILES, MINERAL PARTICLES AND CERAMICS. ("Sylon" is non-acidic, and does not cause deterioration of cellulose fibres.)

OTHER SUGGESTED USES—As a primer for hydrophilic surfaces to promote the adhesion of organic materials and prevent stripping in the presence of water; as a chemical and physical modifier of oils and resins for the paint and petroleum industries.

OUR RESEARCH CHEMISTS will be glad to answer specific technical questions about "Sylon," or to visit your plant for on-the-spot consultations.

Write today for descriptive folder giving complete information about "Sylon," its properties and potentialities. Address Dept. P, 3M Company, 900 Fauquier Ave., St. Paul 6, Minnesota.

SYLON

MADE BY 3M COMPANY

MINNESOTA MINING & MFG. COMPANY

ALSO MAKERS OF "3M" BRAND CHEMICALS & COLOR PIGMENTS • ABRASIVE PAPER & CLOTH • ADHESIVES • "SAFETY-WALK" ROOFING GRANULES • "SCOTCH" BRAND TAPES • "SCOTCHLITE" • "SPHEREKOTE" TYMPAN PAPER

Every known requirement of leading industries, every proved scientific advance in pneumatic control, every advantage of unmatched research and experience, has guided the design of the new Foxboro Model 40 Stabilog Controller. The results are simpler and more rugged construction, easier and more stable adjustments, unequalled performance.

Foxboro 40

STABILOG* CONTROLLER

Write for complete explanation in Bulletin 381. The Foxboro Company, 138 Neponset Avenue, Foxboro, Mass., U.S.A.

* Reg. U. S. Pat. Off.

The NEW LIGHTWEIGHT • LOW PRICED

"TIMBERHOG" GASOLINE SAWS!

Easily converted to 2 man saw with addition of extra helper's end.

Also available as 2 man unit — 24 and 30" capacity. Timberhog portable gas saw, equipped with dependable built-in power plant is ideal for operation anywhere — especially in remote sections.

MODEL No. 1

20" One Man Saw 52 lbs. $325.00

24" Two Man Saw 54 lbs. $335.00

30" Two Man Saw 57 lbs. $345.00

NO OTHER SAW HAS THIS BIG 4 COMBINATION!

HORSEPOWER: Light weight 4 H. P. gas engine, 4500 R.P.M., 2 cycle, air cooled, with strong die-cast aluminum or magnesium parts for durability — delivers power far in excess of load requirements.

FUEL INJECTION: No carburetor troubles — positive fuel injection eliminates carburetor and enables motor to operate at 90 (or more) degree angle without adjustment or flooding.

LIGHTER WEIGHT: The lightest weight portable chain saw per horsepower available because of die-cast aluminum or magnesium parts and compact design. Maximum cutting power at minimum handling weight.

LOW PRICED: The lowest price one-man portable chain saw per horse-power on the market today! The TIMBERHOG is economical to operate and the lowest in first cost and maintenance.

SPECIFICATIONS

ENGINE: 4 H. P. 4500 RPM single cylinder, two cycle, air-cooled.
BEARINGS: Anti-friction throughout.
FUEL SYSTEM: Positive fuel injector enables engine to operate at 90 degree angles or more.
IGNITION: High tension magnet with reverse flux, single coil, waterproof, adjustable.
TRANSMISSION: Specially heat-treated alloy gears — 3 to 1 ratio.
CHAIN: 5/16" kerf, 5/8" pitch, speed 1200 FPM.
OILING TO CHAIN: Positive hand pump.
CLUTCH: Automotic centrifugal.
CONNECTING ROD and CRANKSHAFT: Heat-treated steel forgings, hardened and ground.
GUIDE BAR: Alloy saw steel, adjustable for chain tension.

Address all inquiries to TIMBERHOG Saw Division

NEW YORK OFFICE:
75 West St., New York 6, N. Y.

"TIMBERHOG" SAWS
REED-PRENTICE CORP.
WORCESTER MASS., U.S.A.

CLEVELAND OFFICE:
1213 W. 3rd St.,
Cleveland 13, Ohio

N·B·M Babbitt Metals
Blended by "Master Chefs"

- **THE FINEST INGREDIENTS**—We use only the best virgin metals money can buy.
- **A PERFECT "RECIPE"**—Exhaustive laboratory tests and years of service have proved our formulas.
- **EXPERT PREPARATION**—Scientific controls and the master's touch assure perfect blending at the proper fusing point — freedom from oxide — absolute uniformity.

Quality tells in better service when you specify N-B-M Babbitt Metals.

N • B • M
BABBITT METALS

NATIONAL BEARING
DIVISION
ST. LOUIS • NEW YORK

AMERICAN Brake Shoe COMPANY

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

HERCULES RESEARCH

A paper coating machine at the Hercules Experiment Station Laboratory

IT PAYS TO KNOW *MORE* ABOUT

HERCULES

H HELPS FROM PULP MILL TO CONVERTER

Hercules research has resulted in chemical materials that have found wide application in the paper industry.

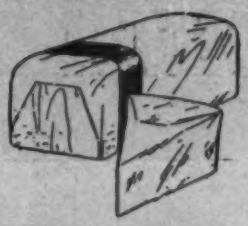
Outstanding are Hercules rosin sizes. As the world's largest producer of rosin and its derivatives, Hercules has applied its research to the development of many rosin and synthetic resin sizes that cover a wide range of needs, from fine writing stock to paperboard. In addition, Hercules research has made possible the Paracols* (wax and wax-resin emulsions) for waterproofing, and for improving paper finish, flexibility, and printability.

Hercules research also has resulted in many improved chemical materials for the converter and coater. For example, nitrocellulose, ethyl cellulose, and cellulose acetate, are the bases for lacquer finishes of excellent adhesion, durability, brilliance, and beauty.

For details on Hercules chemical materials for the paper industry, or for information on how Hercules can complement your research, mail the coupon at right.

*Reg. U. S. Pat. Off. by Hercules Powder Company

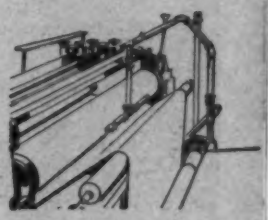
Hercules chemical materials for the paper industry include:



Staybelite* Esters...
Wax additives for coating and laminating processes, modifiers for GRS and Neoprene latices for impregnating and laminating paper and board stocks.

Hercolyn*...
A liquid resin for transparentizing. Possessing excellent fiber-wetting properties, it is useful for the production of transparent and translucent papers.

Chemical Cotton...
Hercules chemical cotton is a pure cellulose, in loose or sheet form. Cleanliness and brightness are outstanding.



Casein...
Hercules casein is used as the binder in clay-coatings, and as an adhesive in laminants and paper converting.

Vinsol* Resin...
A dark-colored resin with a high melting point. Low in cost, it is economical as a stiffener for paperboard.

Chemicals...
These include sulphonated oils, foam killers, eveners, acids, alkalies, alum, and satin white.

FOR FURTHER DETAILS

Papermakers Chemical Department
HERCULES POWDER COMPANY
INCORPORATED
961 King Street, Wilmington 99, Delaware

Please send information on _____

_____

Name _____

Title _____

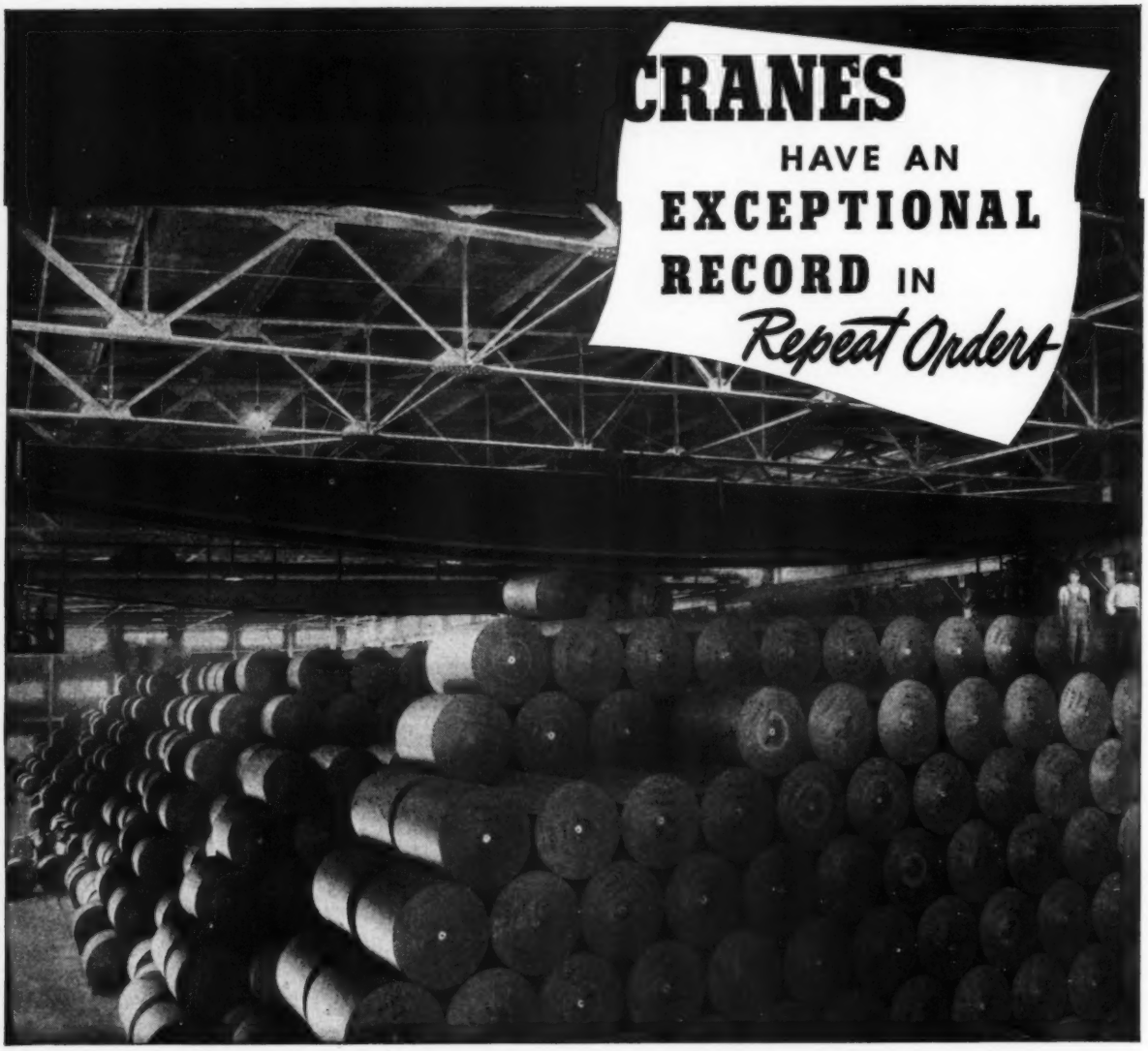
Company _____

Street _____

City _____ *Zone* ____ *State* _____

P-44

CHEMICAL MATERIALS FOR THE PAPER INDUSTRY



Years of Experience With Paper Mill Cranes and Hoists

For years Northern has designed and built overhead cranes of all kinds especially for the paper industry. We have furnished handling equipment to the majority of the large mills throughout the United States and Canada. This wide experience has resulted in the development of cranes and hoists built particularly to suit the industry's needs.

Northern Cranes and Hoists are furnished to handle any load, with speeds, lift, span, etc. to suit your requirements.

Many paper mills are regular purchasers—have large numbers of Northern Cranes and Hoists in operation.

Repeat business of this sort is obtained only by the very highest quality—the type of quality built into Northern Cranes.

WRITE FOR BULLETIN

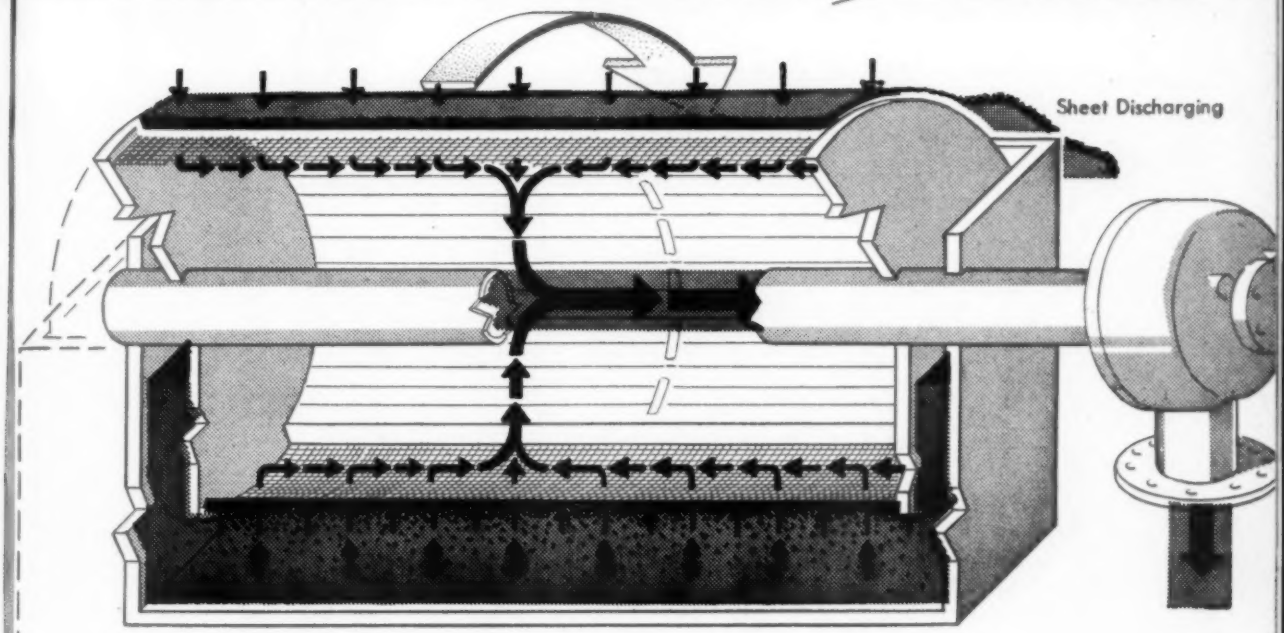
NORTHERN ENGINEERING WORKS

General Offices: 2625 ATWATER ST.
DETROIT 7, MICH.

HEAVY DUTY CRANES • LOW HEADROOM CRANES
BUCKET CRANES • TRANSFER CRANES • ELECTRIC
HOIST CRANES • HAND CRANES • ELECTRIC HOISTS
AIR HOISTS • SPECIAL CRANES AND HOISTS

OLIVER SAVEALL

. . . STOPS FIBER LOSSES MECHANICALLY



This is a point sometimes overlooked and it's a point worth discussing.

Being a mechanical operation—a simple, physical separation of fiber from white water—Oliver Saveall operation requires no skilled technical supervision to make it successful. No delicate chemical adjustments are needed. Actually the Saveall functions as an efficient filter, continuously interposing a sheet of pulp to stop the fibers from flowing away. The fibers are continuously discharged with the pulp to the machine circuit.

Since its introduction to the paper field over 20 years ago, the Oliver Saveall has fulfilled its high expectations. Several hundred already have been installed. Progress in design and construction has been made, of course, notably in methods for discharging the sheet. Today, Oliver offers either rubber covered or durable redwood tank and drum construction plus a selection of three dischargers: Hydrair, Oliver Denhard, and Discharge Roll—the choice being determined by the kind of fiber handled and the sheet formed. With such a selection, the Oliver Saveall is adaptable to any kind of stock. It is described in Folder F-109.

Today's problem of white water control is both economic and sanitary. That's why you need the simplest and most effective unit you can find. Why not have an Oliver United Engineer recommend the type and size of Oliver Vacuum Saveall for your mill?

OLIVER PULP FILTER

OLIVER Ringvalve Sulphate Wash
OLIVER Ringvalve Sulphite Wash
OLIVER Ringvalve Soda Washer
OLIVER Ringvalve High Density Thickener
OLIVER Ringvalve Bleach Wash
OLIVER Ringvalve Decker
OLIVER Saveall
OLIVER High Density Thickener
OLIVER Pulp Washer
OLIVER Groundwood Decker
OLIVER Groundwood Washer
OLIVER Lime Mud Filter
OLIVER Board Forming Machine

OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

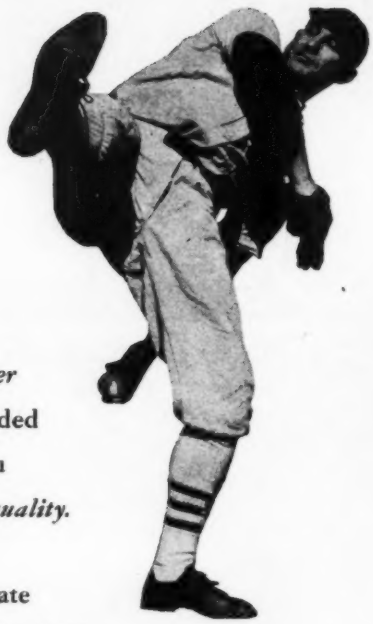
San Francisco 11
California

Chicago 1, Illinois
221 N. LaSalle Street

Canada: **Sales & Manufacturing Representative, E. Long Limited, Orillia, Canada**

Factories: **Oakland, Calif. - Hazleton, Pa. - Orillia, Canada - Melbourne, Australia**

Western Sales Divi
Oakland 1, Califo
2900 Glascock Str



Substitutes may be okay in a ball game

But not in the production of *coated paper of high quality*—at the speed demanded by modern industry. For this purpose, you must use a *Calcium Carbonate of high quality.*

Wyandotte Precipitated Calcium Carbonate is unequaled—in brightness and freedom from grit and abrasiveness . . . in hiding power and ink absorption . . . in that uniformity which is essential to coating.

This superiority of Wyandotte Precipitated Calcium Carbonate is not the result of hurry or hit-and-miss methods. For years Wyandotte Chemicals Corporation has made a *business* of producing Precipitated Calcium Carbonate . . . steadily increasing its store of technical knowledge . . . constantly improving its expertness.

So it is that today Wyandotte is meeting the need of the paper industry with the very best in Precipitated Calcium Carbonate.

TECHNICAL BULLETINS ARE AVAILABLE UPON REQUEST

Wyandotte
Reg. U. S. Pat. Off.

WYANDOTTE CHEMICALS CORPORATION • MICHIGAN ALKALI DIVISION • Wyandotte, Michigan

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

8 SULPHATE DIGESTERS

The above photo shows one of eight 10 ft. diam. by 25 ft. sulphite digesters we built for a kraft mill in Mississippi. They are designed in accordance with the ASME Code for Unfired Pressure Vessels and were stress-relieved before shipment. Steel plate work of this type, built to specific paper mill requirements, is helping many mills to meet production schedules.

We also have facilities at our Birmingham, Chicago and Greenville, Pa., plants for x-raying and stress-relieving shop-built vessels in accordance with Paragraph U-68 of the ASME Code for Unfired Pressure Vessels. If you are planning on modernizing your mill or expanding your production facilities, write our nearest office outlining your steel plate work or pressure vessel needs.

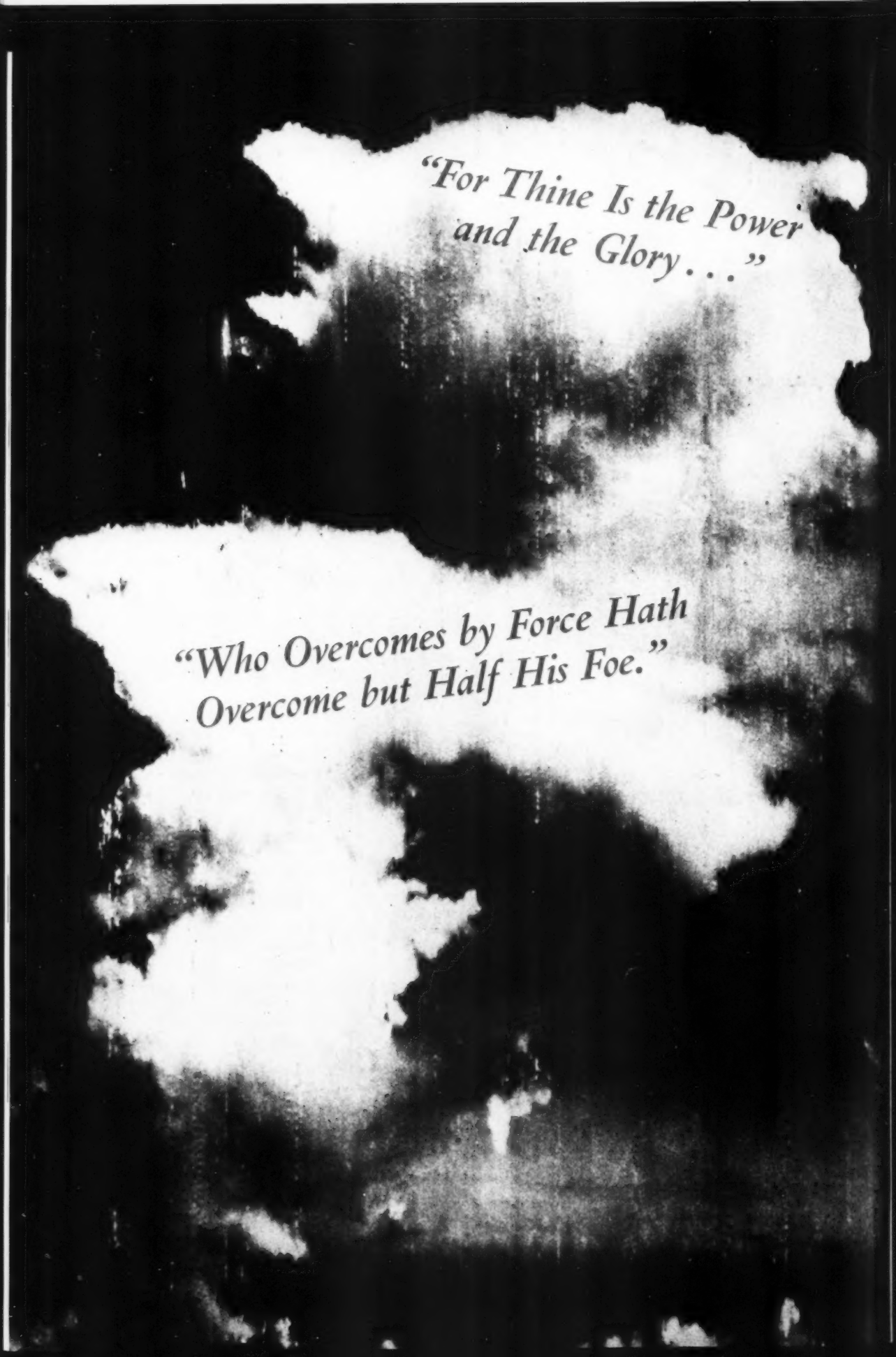
SOME OF THE OTHER PRODUCTS WE BUILD FOR THE PAPER INDUSTRY

- Flat-bottom Storage Tanks
- Cylindrical Tanks
- Diffusers
- Sulphate and Sulphite Digesters
- Steel Smoke Stacks
- Barking Drums
- Bins
- Hot Water Tanks
- Oil Tanks
- Pressure Vessels
- Elevated Steel Tanks

CHICAGO BRIDGE & IRON COMPANY

Chicago, 4.....2445 McCormick Building
New York, 6.....3350-165 Broadway Building
Cleveland, 15.....2267 Guildhall Building
Los Angeles, 14.....1459 Wm. Fox Building
Birmingham, 1.....1511 North 50th Street
Atlanta, 3.....2143 Healey Building
Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PENNA.

Tulsa, 3.....1651 Hunt Building
Houston, 1.....5643 Clinton Drive
Philadelphia, 3.....1653-1700 Walnut Street Building
Washington, 4.....703 Atlantic Building
San Francisco, 11.....1217-22 Battery Street Building
Detroit, 26.....1566 Lafayette Building
In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.


"For Thine Is the Power
and the Glory . . ."
"Who Overcomes by Force Hath
Overcome but Half His Foe."

TRADE WINDS

Pulp and Paper Notes *from Foreign Trade Journals*

▸▸▸ THE DATA published here is from a series of reviews based on foreign trade and government journal items, and has been released by the American Paper and Pulp Association. This review (the fourth of the series) contains brief resumes on the wood pulp and paper industries in Germany, Italy, and France, highlighting war damage and reconstruction efforts.

The sources of this data are as follows:

Kommersiella Meddclanden, Sweden, April, 1946

Svensk Pappersmassetidningen, April 10 and May 15, 1946.

Svensk Papperstidning, April 30 and May 15, 1946

Foreign Commerce Weekly, June 1, 1946

(*) Indicates translated from Swedish.

The Paper Industry in Germany

Feldmuhle Paper and Pulp Mill in Russian Occupied Zone

The large Feldmuhle Paper and Pulp Mill in the vicinity of Stettin, Germany, is now being dismantled by the Russians who are sending the machinery into Russian territory.*

*Paper Industry in American and English Occupied Zones**

Recently the paper industry in the western and southern parts of Germany has been, like other industries, the subject of considerable study to ascertain its productive capacity. This study has been carried on by an Anglo-American organization called the Combined Intelligence Objective Sub-Committee.*

The Feldmuhle Concern's mill in Reisholz has been only partially damaged, and partial production has been resumed. Groundwood production has risen to 120 metric tons a day, and newsprint manufactures to 3,800 metric tons per month.

The company's mill at Arnsberg which prior to the war produced high quality folding boxboard, is undamaged and is intermittently in production depending upon coal supplies. Present production consists of chromoboard, roofing-board for reparation purposes, and board made from waste paper. Daily production is said to be about 100 metric tons per day, utilizing wastepaper, groundwood of own production, and purchased bleached and unbleached sulphite wood pulp.

The Aschaffenburg Division of the Feldmuhle Company was severely damaged during the war, but partial production has been resumed. Of the seven machines, one was destroyed during the war. Half of the total pulp production is refined at the mill, the remaining production being used in the company's other mills or sold to paper mills.

The Mannheim Division of the Feldmuhle Company, belonging to the Waldorf Group, suffered severe damage.

The Haindl'sche Papierfabriken-Augsburg-plant was almost entirely destroyed.

The Schongaubruket Plant was undamaged and produces about 100 tons of newsprint paper a day.

Italy's Paper Industry

At the time of the liberation of northern Italy, the paper industry was practically idle because of the lack of raw materials. Stocks of wood pulp and other raw materials which were formerly imported from Sweden, Austria, Germany, Switzerland, and Canada were depleted. Production fell from 450,000 tons in prewar years to 112,000 tons in 1944-45.

In the fall of 1945, agreements were

A NATURAL PHENOMENON appeared following the atomic energy experiment at "Operation Crossroads." . . . As the smoke dissipated, it formed a question mark against the sky, leaving in the mind of man the most momentous question of the age: "How will this new source of power affect civilization?"

(Acme telephoto)

reached with Sweden whereby that country was to send to Italy 15,000 tons of wood pulp to be paid for by products available in Italy or through clearing arrangements. Of that amount 3,000 tons were to be shipped during the first six months of 1946.

Italy's equipment for paper production, consisting mostly of machinery imported from Germany, was left practically intact by the war. The country has 387 paper manufacturers, 10 of which in northern Italy are rather important. They employ about 40,000 workers. The majority of the producers comprise small family groups working on an artisan basis.

Italian paper production normally amounts to approximately 450,000 tons a year, of which 50 per cent is wrapping paper, 15 per cent printing paper, and 35 per cent white and colored paper.

There are no paper reserves now available in Italy. Daily production averaging 400 tons, is immediately absorbed by domestic consumption. Prices have increased 30 times over those of 1940. Paper imports into Italy are now practically nil. About 5 per cent of a special cigarette paper is exported to the Balkans and Egypt.

Coal and Coke Imports (Sweden)

Based on Official Swedish Statistics, coal imports for the first quarter of 1946 were 413,833 short tons, of which 223,411 short tons were imported into Sweden in March. First quarter imports last year were only 772 short tons.

Coke imports for the first quarter of this year were 230,285 short tons, of which 93,777 short tons were imported in March. First quarter imports last year were 1,190 short tons.

Pulpwood Shortage

The Utansjo sulphite mill will halt wood pulp production the early part of June, until the beginning of August, because of lack of pulpwood * (Capacity 50,000 metric tons of pulp per year).

SWEDEN

Total Exports of Wood Pulp, Paper and Paperboard (short tons)

	First Quarter		March	
	1945	1945	1946	1945
Total: Wood Pulp (Dry Weight)	340,734	6,788	45,222	465
Mechanical, Wet	20,005	66	3,561	....
Mechanical, Dry	6,693	26	1,006	....
Sulphite, Bleached	89,373	1,304	26,632	443
Sulphite, Unbleached Wet	3,239	285	1,289	....
Sulphite, Unbleached Dry	125,625	1,516	4,829	....
Sulphate, Bleached	11,421	550	427	....
Sulphate, Unbleached Wet	360	783	.....	22
Sulphate, Unbleached Dry	84,018	2,258	7,478	....
Total: Paper and Paperboard	105,782	17,402	34,349	2,182
Total: Paperboard	6,559	1,252	2,092	203
Total: Paper	99,223	16,150	32,257	1,979
Newsprint	24,797	7,458	8,410	565
Coated Paper	35	.....	23	....
Kraft Wrapping	30,857	1,979	10,410	113
Sulphite Wrapping	14,287	1,493	5,193	180
Other Wrapping	5,443	543	1,521	97
Vegetable Parchment, Greaseproof Glazed Transparent Paper	4,561	232	1,424	79
Writing and Printing, Copying, Wall Paper, Etc.	19,243	4,445	5,276	945

Source: Kommersiella Meddelanden, Sweden, April, 1946 (Official Swedish Statistics).

Pulpwood Shortage (Norway)

The Krogstad Sulphite Mill halted production the middle of April and will remain down for several months because of a shortage of pulpwood. The mill produced only 4,200 metric tons of pulp in 1945, 1,900 tons of which was fodder pulp. Pulpwood received at the mill last year was only 10 per cent of normal receipts. The mill's annual capacity is figured at about 30,000 metric tons of bleached sulphite pulp.*

NORWAY

Total Exports of Paper and Paperboard (short tons)

	January and February		February	
	1946	1945	1946	1945
Total: Paper, Paperboard, Carton	41,254	7,411	24,895	4,347
Total: Paperboard and Carton	7,120	64	4,467	49
Total: Paper, including	34,134	7,347	20,428	4,298
Newspaint in rolls 50 gr. and over	10,183	4,534	7,194	3,211
Newsprint in sheets 50 gr. and over	35	482	.....	260
Wrapping paper, total	9,319	896	5,680	300
Including Kraft	1,910	301	1,468	....
Sulphite Wrapping	1,871	....	833	....
Greaseproof and Glazed Transparent Paper	2,566	196	1,585	196
Other Printing and Wrapping	14,593	1,403	7,523	495
Boards	7,120	64	4,467	49

Source: Svensk Papperstidning, April 30, 1946

The French Paper Industry*

Prior to 1939, the French paper industry produced about 1,200,000 metric tons of paper annually. During the German occupation production fell to about 200,000 metric tons yearly and after liberation, production decreased still further. With reference to wood pulp, about 460,000 metric tons of wood pulp were imported, and 361,000 metric tons were of domestic manufacture. (prewar basis).

A large amount of pulpwood was imported, but imports depended largely upon lower costs for both wood and imported wood pulp.

Prior to the war, domestic manufacture of wood pulp was comprised of 236,000 metric tons of mechanical pulp, 60,000 metric tons of sulphite pulp, and 38,500 metric tons of kraft or soda pulp. An additional 27,000 metric tons of pulp were manufactured from straw and other materials. A large portion of this combined capacity is still intact. With reference to the kraft and soda pulp capacity this has been increased, and as soon as the equipment installation is completed, which was partially installed during the German occupation, production will be started.

The French kraft paper industry, which in May of last year produced at an annual rate of about 41,400 metric tons, is comprised of four paper mills. These four mills have a capacity several times above the present production rate. Some of these mills have modern equipment for the manufacture of spinning paper, bags, sacks as well as corrugated board and cardboard.

The sulphite paper industry is limited to four mills. The mills at Schweigenau and Calais were destroyed, but those at Rouen and Strassburg are still in good condition.

PAPER · · · America's 6th Industry

PAPER CORD FOR RUG-BACKING

(NEWS ITEM: *Paper yarn is replacing jute in the manufacture of rug-backing.*)

Rug-backing yarn, made of Kraft paper with high wet strength, is being used instead of jute on a large percentage of domestic rugs. It is unusually smooth, lies flat and sheds water. This new paper yarn prolongs the life of carpet pile and keeps rugs new-looking longer.

Paper bags for vacuum cleaners . . . paper tape to record sound . . . paper cans for frozen foods . . . New uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

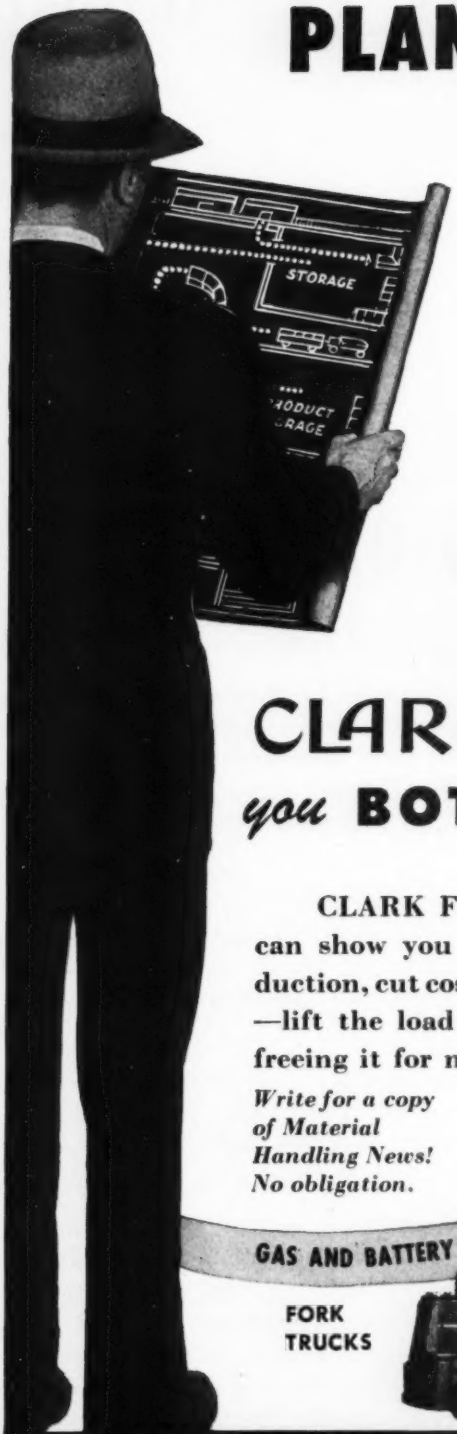
The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Among the new machines under construction by Puseyjones are three of the largest and fastest Fourdrinier Machines, one for book and high grade printing, one for white paper for bags, and one for Kraft liner board; also one Cylinder machine of record size and speed for the manufacture of floor covering felt. Other machines are under construction for the manufacture of M. G. Kraft specialties, facial tissues, and high grade bristols.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK QUALITY



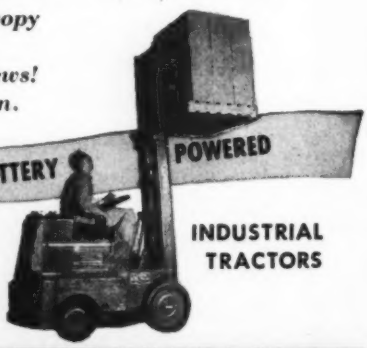
PLANS DEVELOP *Efficient* MATERIAL HANDLING

MODERN MACHINES carry out THOSE PLANS

CLARK *will serve you* **BOTH WAYS!**

CLARK FIELD ENGINEERS can show you how to speed production, cut costs, reduce accidents —lift the load from labor's back, freeing it for more skilled work.

Write for a copy of Material Handling News! No obligation.



CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN
OTHER PLANTS — BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

AMERICAN CAN TO MAKE NEW INSTALLATION AT ITS PLANT IN CHICAGO

As a part of its $4,500,000 expansion program, the American Can Company will install new plant facilities in its Maywood (Ill.) plant which will cost about $1,250,000.

The new Chicago installation will follow the enlargement of the American Can Company's plants in other heavily populated areas. By the middle of 1947, the Maywood installations are expected to have added 35 per cent to the milk container output.

◆

OLD MILL AT PIERCEFIELD MAY BE EQUIPPED TO MAKE WOOD PRODS. & PLASTICS

A short time ago, the 783- acre village of Piercefield, New York, was purchased by Charles I. Ruderman, Gouverneur, New York, industrialist. Included in the purchase were: the idle pulp mill formerly owned by the International Paper Company, two churches, store, garage, and about eighty dwelling houses. Rights to the waterpower of the mill are retained by Systems Properties, Inc., a subsidiary of International Paper Company.

The property has been assessed for about $250,000. The new owner states he has been negotiating with a concern interested in using the mill for the manufacture of wood products and plastics.

◆

FINANCIAL

▶▶▶ Paper mill securities showed a slightly lower price level in June following the general trend of Wall Street markets for other industrial securities. Another factor appearing in the price changes in some securities, however, is the extensive issue of new securities and refunding operations by some of the larger paper companies. Conversion of old preferred stocks to new issues with a lower guaranteed return has resulted in price changes which were compensated in some cases by a change in the demand for the common stocks with possible higher earning opportunities.

Stock Flotations

Container Corporation of America—A registration statement has been filed with the Securities and Exchange Commission covering the sale of 141,496 shares of capital stock. Present stockholders will be given the right to purchase one share of the new stock for each six now held.

International Paper Company—Formal notification has been issued to

The "Sixty" line symbolizes Seybold's sixtieth anniversary

To the paper industry, the name Seybold, for sixty years, has been synonymous with rugged, year-in-and-year-out trimmer dependability.

For sixty years, as a demand for ever-increasing paper tonnage has put a greater premium upon dependability, speed and operator protection, Seybold design and engineering consistently have set the pace for paper trimming equipment.

The new Seybold "Sixty" line of Mill Trimmers, Auto Spacers and Cutters lives up to those high Seybold standards. In addition, it features engineering advances such as the paper industry has become accustomed to expect from Seybold.

Outstanding among these improvements are:

1. ***A Snappy Cutting Action*** — 15% faster — which sets a smoother working tempo.
2. ***Speedier Auto Spacers*** which automatically bring the next cut into position accurately and with no lost motion on the part of the operator or machine.
3. ***Floodlighted Table and Gauges*** further conserve the operator's time and reduce fatigue.
4. ***Selected, Effortless Control*** of clamp pressure assures the correct clamp pressure at all times—regardless of the type of paper being trimmed.
5. ***Traditionally Low Seybold Maintenance Cost*** has been reduced to a point where it is virtually non-existent.

The "Sixty" line is further proof of Seybold's search for perfection in paper trimming equipment—a goal on which Seybold has set its sights during sixty years of

ENGINEERING THE HUMAN ELEMENT AT *Seybold*

HARRIS-SEYBOLD

HARRIS PRESSES ★ SEYBOLD CUTTERS

OTHER PRODUCTS FOR THE GRAPHIC ARTS

HARRIS-SEYBOLD COMPANY · GENERAL OFFICES · CLEVELAND 5, OHIO

stockholders that 400,000 shares of a new $4 preferred stock will be exchanged for the present $5 stock. Holders of the present stock will receive share for share in the new issue plus one-quarter share of common for each previously held share of $5 preferred. International has purchased the Scharff-Koken Manufacturing Company of St. Louis, producer of shipping containers, with an annual capacity of 30,000 tons of containers.

Marathon Corporation—New York underwriters are offering 420,000 shares of $6.25 par value common stock at $37 per share. The bulk of the proceeds will be used to retire outstanding 3¾ per cent debentures, the balance for completion of the new pulp mill in Canada and for domestic plant improvements.

Mead Corporation — Authorization for the issue of 100,000 shares of cumulative preferred shares, $100 par value, with a dividend rate of 4¼ per cent, and for 300,000 shares of cumulative preferred shares, $50 par value, with a 4 per cent rate, has been announced to stockholders. Only 70,000 shares of the first preferred and 101,056 of the second preferred are now being offered. The first preferred will be issued share for share for the present 6 per cent preferred.

St. Regis Paper Company—St. Regis has acquired the Florida Pulp & Paper Company through the exchange of St. Regis common stock for the Florida company securities. A new multiwall paper bag plant to be integrated with the Florida properties, to cost $10,000,000, will be erected by the Alabama Pulp & Paper Company. St. Regis will have a 25 per cent equity in the Alabama company, and will participate in financing the new venture. (See item this section.)

Sutherland Paper Company—A new issue of 57,400 shares of $10 par value common stock is being offered for subscription at $40 on the basis of one share for each five now held. The balance will be offered by an underwriting group at a price yet to be determined.

Corporation Earnings

American Tissue Mills—Net profit in 1945 was $91,417 as compared with $74,563 the previous year.

Celotex Corporation—Net income for six months ended April 30, 1946, was $1,249,123 as against $305,895 for the same period in the preceding fiscal year.

Chemical Paper Manufacturing Company—Net profit in 1945 was $106,890 as compared with $111,123 the previous year.

Crocker-McElwain Company—Net profit in 1945 was $97,593 as compared with $112,522 the previous year.

West Virginia Pulp & Paper Company—Net profit for six months ended April 30, 1946, was $2,300,173 as compared with $1,145,783 for the same period in the previous fiscal year.

New York Stock Exchange—Stocks

	Closing Prices June 25	May 25
A.P.W. Products ..	8¼	8⅝
Celotex	34¼	29⅞
Same Preferred..	22⅜	20⅞
Certain-teed Prod...	23¾	24⅜
Same Preferred..	...	...
Champion P&F Co.	*58–60	66¼
Same Preferred..	111	*112½–113
Container Corp. ..	50¼	52¼
Cont. Diamond ...	14½	15¾
Crown Zellerbach..	33¾	37⅜
Same Preferred..	108½	*108¾–109
Same $4 Pref....*125–132		139
Dixie Vortex	47	49½
Same "A" *57½–58¾		59½
Gaylord Container .	20½	23⅜
Same Preferred..*117–125		140
International Paper.	45⅜	49¾
Same Preferred..	115½	123½
Kimberly-Clark ...63½–64		69⅜
McAndrews & Forbes *41⅜–42		41
Masonite	66	67½
Mead Corp.	24	27½
Same Preferred..	105¾	*105½–106
National Container.	33	35¼
Paraffine Cos.	*82–84	*81–84
Same Preferred..*108–115		*109–113
Rayonier	27¾	30¾
Same Preferred..	38	38¼
Scott Paper	*56–57	55⅞
Same Preferred..	110½	108½
Sutherland Paper..	43	50
Union Bag & P...	33⅞	35¾
U. S. Gypsum....*122¼–124⅝		129⅞
Same Pre'erred..	200½	*203½–205
West Va. P&P....	47½	48
Same Preferred..*113–114		114¼–115

New York Stock Exchange—Bonds

Abitibi 4%	112	109⅜
Celotex 3¾%	...	...
Certain-teed Prod. 5½%	...	...
Champion P&F Co.	...	105
Intl. Paper 5%....	101¼	101¾

New York Curb Exchange—Stocks

Am. Writing	...	10¼
Great Northern ...	40⅝	42½
Hummel-Ross	16⅝	19⅜
St. Regis	13¾	14¼
Taggart	11	11¼
United Wall Paper.	11⅛	11¾

*Closing Bid and Asked Prices.

◆

BRITISH PAPER NOTES
May, 1946

The beginning of the second year of peace in Europe is marked by a very definite feeling of apprehension in the British Paper Trade as in every other industry. The results of the experiments in nationalization by the present labor government are yet to be seen. Apart from the serious food situation which has now reached a stage where the possibilities of declining production as a result of under nourishment has to be faced, it is a strange coincidence that in practically every industry reports are being made that the situation will become more acute as the year progresses instead of improving as anticipated. Production of all kinds is either held up or slowed down and over it all looms the possible determination of the coal situation.

From the Paper Trade, warnings have been received that the next license period (the 22nd covering July to October) will not produce more paper but that the output will be less than in the present period. This is due to several causes: the period is shorter, by one week, more time will be lost through annual holidays, and the problem of manpower has not yet been solved. While some of the younger men have returned from service, the position of the older men is much more serious. These men have been urged forward during the past several years by the needs of war but now that this has ceased a reaction has set in and many are showing signs of fatigue if not falling out altogether. The problem of women-power continues to cause anxiety. On top of all these factors there are no signs of increased material supplies.

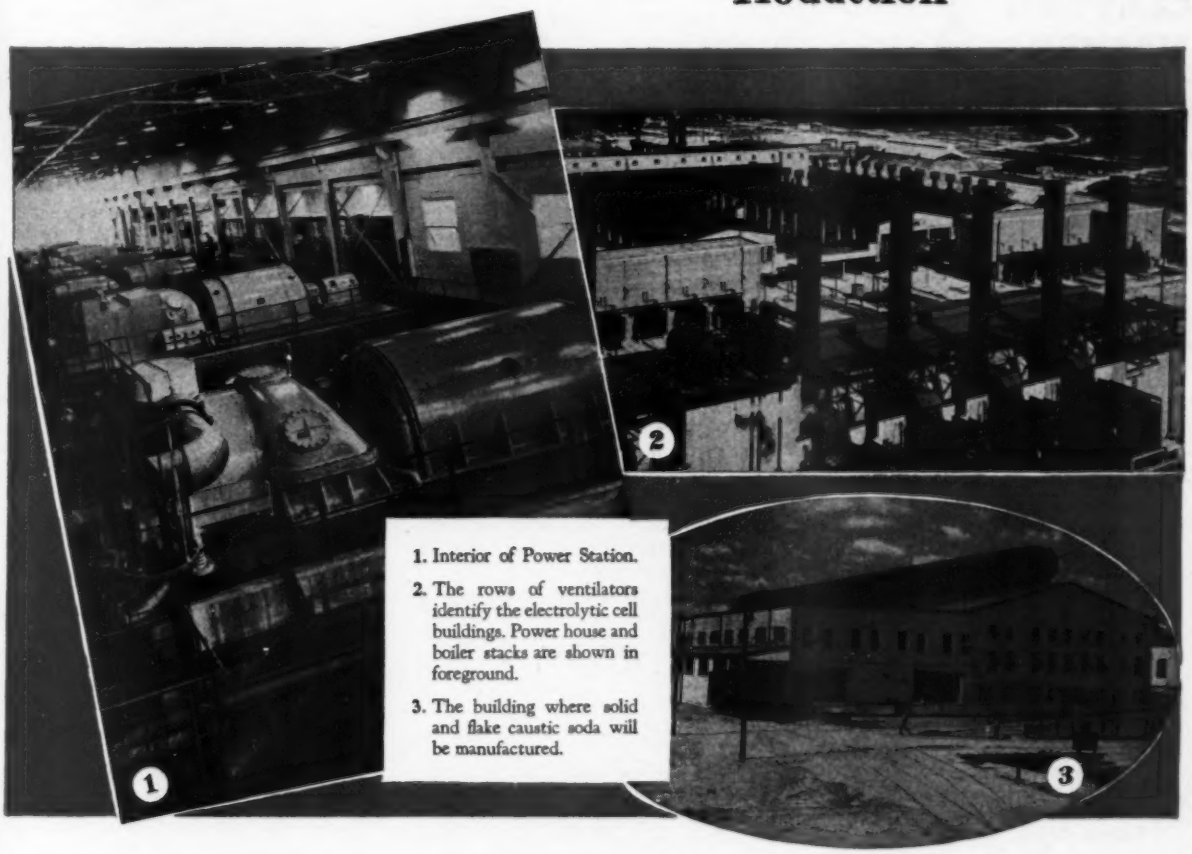
It would seem that for the time being paper production has reached its peak and this peak will satisfy only about half the current needs.

A further difficulty for the mills is the government's export plans. Many mills require new machinery or replacements. The machinery that is being made is for export only. Consequently the domestic mills are having to produce paper for export with inferior materials in competition with other countries, and the much needed machinery which might help to improve home standards is leaving the country. Paper manufacturers are not pleased with the possibility that the exported machinery may eventually be used in competition with them.

The printers have made a request to the government for the reception of a small deputation in order to place before the government the serious position created by the continued acute shortage of paper. In the first place, they stress the accumulating arrears of current orders particularly in the way of literature for exporters and secondly their inability to utilize the available manpower economically on short runs due to inadequate paper supplies.

A close link with the printers is the new president of the National Association of Paper Merchants, J. E. Pickering. At one time a frequent visitor to America on behalf of a certain mill, he now is managing director of a leading firm of merchants in Lon-

Lake Charles Plant will increase *Caustic Soda—Chlorine* Production



1. Interior of Power Station.
2. The rows of ventilators identify the electrolytic cell buildings. Power house and boiler stacks are shown in foreground.
3. The building where solid and flake caustic soda will be manufactured.

Built to make wartime magnesium, "Lake Charles" is being converted to the manufacture of chlorine and caustic soda. While actual production will not start until some time next year, the existence of certain vital facilities permits an earlier start than would be possible by constructing an entirely new plant. "Lake Charles" will be operated by The Southern Alkali Corporation—a Pittsburgh Plate Glass Company affiliate. Located in Louisiana, this plant adds an important link to a cross-the-country group of facilities, all strategically located to serve industry efficiently and economically. This group includes a Texas Plant at Corpus Christi—owned by The Southern Alkali Corporation—and Columbia plants at Barberton, Ohio, Natrium, W. Va., and Owens Lake, Calif.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY

COLUMBIA CHEMICAL DIVISION

FIFTH AVENUE at BELLEFIELD, PITTSBURGH 13, PENNSYLVANIA · Chicago · Boston · St Louis Pittsburgh · New York · Cincinnati · Cleveland · Philadelphia · Minneapolis · Charlotte · San Francisco

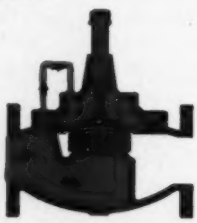
COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS
Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Pittchlor (*Calcium Hypochlorite*) • Silene EF (*Hydrated Calcium Silicate*) • Calcium Chloride • Soda Briquettes (*Iron Desulphurizer*) • Modified Sodas • Caustic Ash • Phosflake (*Bottle Washer*) • Calcene T (*Precipitated Calcium Carbonate*)

WHEN YOU USE
CLAYTON
VALVES

QUICK, easy access to all working parts of Clayton Valves is provided on *top* of the valve. There is no necessity for having to allow for room to get at the Clayton Valve from the bottom. There are no complicated parts to disassemble. The large diameter top plate or valve cover gives wide-open access to every part... as easy as shooting fish in a tub! Clayton Valves require minimum attention ...and you save additional time and expense for they are so easy to get at when necessary. This is but one of the many time-and-money-saving features you enjoy when you specify Clayton Valves.

THE CLAYTON LINE

includes Remote Control Valves, Float Control Valves, Altitude Valves, Check Valves, Constant Discharge Pressure Valves, Pump Control Valves, Backflow Prevention Units.



Write for Engineering Data
VALVE DIVISION
CLAYTON MANUFACTURING CO.
Chicago • Alhambra, Calif. • Philadelphia

don. He was a prime mover in the recent Standardization Agreement between the British Federation of Master Printers and the Merchant's Association. He was also actively engaged in the new Merchant's Charter, which placed the whole of the merchanting trade on a regional and sectional basis, and he is a keen supporter of controlled prices at fair levels for maker, merchant, and consumer. Another item he will press for during his term of office, it is understood, is the presentation of a national advertising campaign on behalf of paper to bring this more sharply before the public and make the government realize more completely the necessity of paper and print in the well-being of the nation.

The continuing restrictive position of papermaking materials is revealed by the Board of Trade figures covering the first four months of the year. Whereas these reached 211,430 tons, the imports for the same period of 1938 were 654,612 tons. It is a remarkable fact that these imports for the latest month, April, were little more than the quantity imported in April last year when the European war was still in progress. While a decline over the four months, as compared with 1938, of approximately 40 per cent and 50 per cent are shown against mechanical and pure pulp, the most serious fall is, of course, in the esparto grass section wherein the respective totals for January-April 1945 and 1938 are 10,317 and 103,736 tons.

The imports of paper and board still continue on an extremely low level. The total for January-April this year was 84,600 tons against 356,402 tons during the same period of 1938, but as Britain is purchasing heavily in wallboards for the housing program the actual paper import position is more serious than the figures portray, the total for paper alone being only 67,856 tons. At the present rate, these imports will reach only roughly 200,000 tons for the year against a prewar figure of over a million tons.

An interesting sidelight in these figures is the imports from America. Whereas in 1938 these averaged 2,415 tons per month in April, 1945, they were 16,190 tons and April this year 28 tons or for the four months this year 3,333 tons against 9,660 tons for the first four months of 1938.

The death was reported recently of an interesting member of the British Paper Trade in the person of Arthur Millbourn. He was in his 90th year and served his apprenticeship in the handmade section of the trade being, incidentally, the holder of a certificate to this effect issued the Original Society of Papermakers. For many years he was with Messrs. T. R. Saunders at their handmade mill, and in 1899 opened his own handmade mill at Tuckenhay in Devon. The handmade watermarked papers, bearing his name, eventually became known throughout the world.

◆

THILMANY WILL ADD TO MACHINE ROOM—ALSO ADD ANOTHER PAPER MACHINE

An addition to its No. 8 machine room is planned by Thilmany Pulp and Paper Company, Kaukauna, Wisconsin. This addition is being built to house another paper machine—No. 10 machine. It is thought the new machine will be in operation in the summer of 1947.

The new machine will be almost a duplicate of the No. 8 machine. The two machines, No. 8 and No. 10, will be housed in the one room, with only a row of columns between. A full basement will be provided to house pumps, felt section and breaker beater. The No. 8 machine has been altered and repaired recently at an expense of $45,000. This change is the first step toward retiring the No. 5 machine.

The new No. 9 machine has taken the place of No. 3 and No. 4 machines. The No. 3 has been sold to a paper mill in Ohio, and No. 4 is now in Santos, Brazil.

◆

GENERAL PAPER SITUATION

The fact that paper mill operations in June have been at the rate of approximately 104 per cent of six day capacity is indicative of some outstanding facts as to the future market situation in the United States, which may be summarized as follows:

1—The ability of the mills to run at this high rate is evidence that the large receipts of Scandinavian pulp and the present situation as to wastepapers have markedly relieved the raw material situation.

2—With operations at this rate, the production of the mills is tending to relieve the consumer shortage, if not as yet bringing consumption and production into balance.

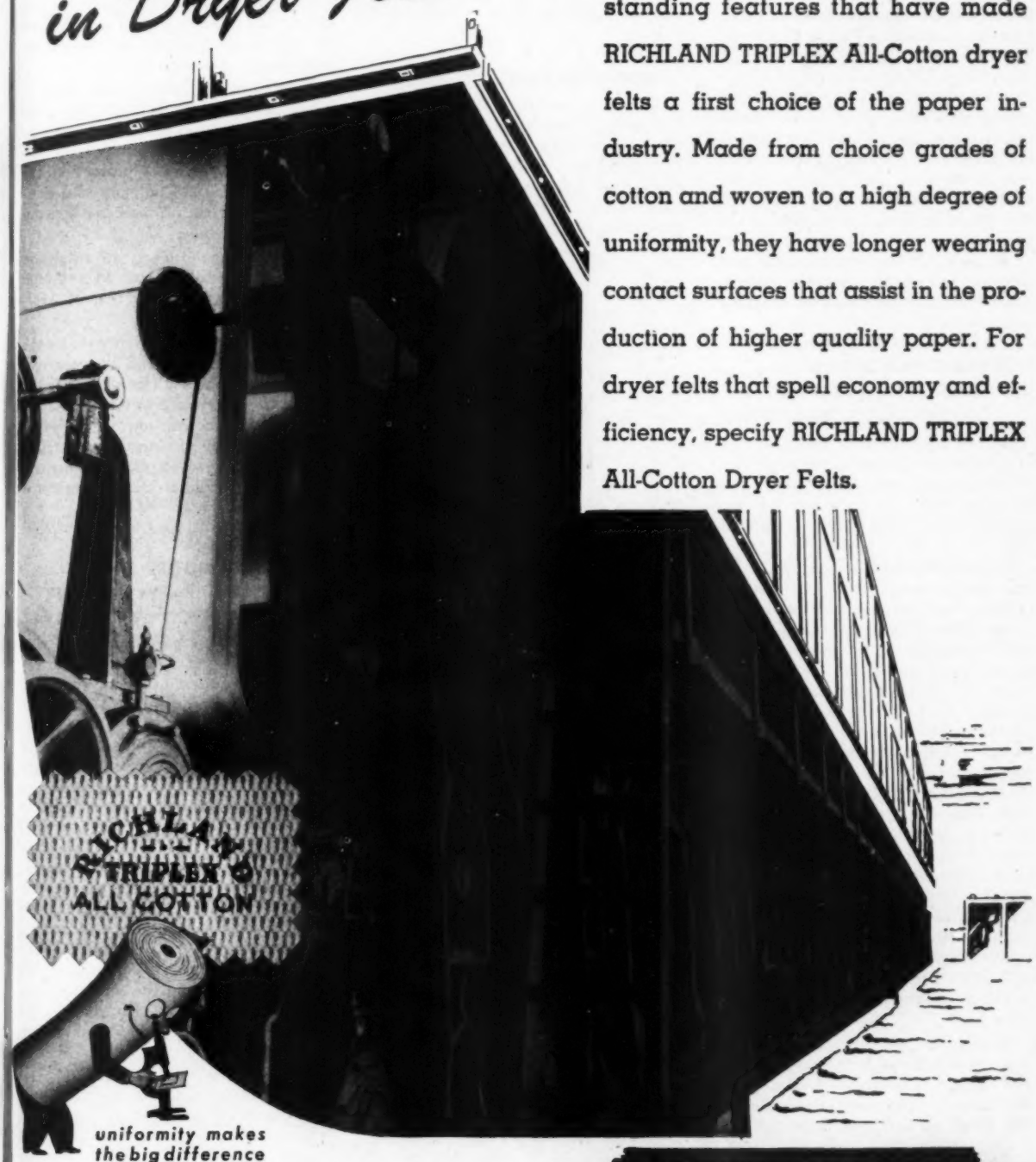
3—New productive capacity coming into the field in the coming eighteen months will still further serve to meet consumer demand.

4—Whether or not the paper industry is going into another over-building cycle remains to be seen. Previous periods of paper scarcity have been followed by sufficient additions to capacity to convert a sellers market into a buyers cycle.

5—Outspoken fears of a permanent paper shortage are being proven un-

For Economy in Dryer Felts . . .

Longer lasting, minimum stretch and shrinkage, and high porosity with lower steam consumption are the outstanding features that have made RICHLAND TRIPLEX All-Cotton dryer felts a first choice of the paper industry. Made from choice grades of cotton and woven to a high degree of uniformity, they have longer wearing contact surfaces that assist in the production of higher quality paper. For dryer felts that spell economy and efficiency, specify RICHLAND TRIPLEX All-Cotton Dryer Felts.



uniformity makes the big difference

Mt. Vernon-Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. • NEW YORK

Branch Offices: CHICAGO • NEW ORLEANS • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • SAN FRANCISCO

justified, and the industry is at least on the way to a time when its production will equal consumer and inventory demands.

There are some odd factors in the present situation, however, some of which are likely to have a bearing on future market conditions, others being periodic spasms of a unique character. The imports of groundwood printing paper from Canada are mounting rapidly. In 1938, total imports of such papers were about 9,000 tons. Some recent single months have seen imports of 5,000 tons. These imports are at present doubtless due to excess of demand over available supply. The future effect on the grade outputs of the groundwood mills, however, remains to be seen. If imports continue and demand slackens, the domestic groundwood mills may be forced to up-grade their output.

◆

NORTHEASTERN WOOD UTILIZATION COUNCIL DISCUSSES MARKETING

At a quarterly meeting of the Northeastern Wood Utilization Council held at Shelburne, New Hampshire, the main topic for discussion was organized marketing and integrated logging.

Edgar L. Heermance reported on the first year's operation of Connwood, Incorporated, the statewide marketing co-operative formed in Connecticut for the handling of pulpwood and other forest products. By pooling many timber holdings, the new corporation has been able to secure large contracts not open to the individual owner. This puts it in control of cutting practice. The sponsors believe that organized marketing along the right lines is more effective than any form of government regulaton. A broad market for forest products and mechanized harvesting is opening the way for integrated logging, where all the trees that should be cut under good forestry practice are taken out in one operation, skidded tree length to roadside, and there cut into sawlogs, pulpwood, or whatever material the market calls for.

Before the meeting, the members were shown through the pulp mill of the Brown Company, Berlin, New Hampshire. The woods operations of the company were also inspected.

Council officers elected for the coming year were: Lauren E. Seeley, president; L. W. Rathbun, vice president; Edgar L. Heermance, secretary-treasurer; D. E. Howe and Danial Smiley Jr., executive committee.

The council is made up of foresters and research men from New England and New York who are interested in developing new uses for low-grade wood and wood waste. It employs a field staff and publishes frequent bulletins. At the next meeting to be held October 2 at Syracuse, New York, there will be an invitation conference on new developments in hardwood pulp.

◆

ASHUELOT PAPER CO. SOLD

The plant of the Ashuelot Paper Company, Hinsdale, New Hampshire, has been purchased by the Patchogue-Plymouth Mills Corporation, of Holyoke and Lawrence, Massachusetts. The latter company manufactures paper rugs and material for paper automobile-slipcovers. The Ashuelot company has been one of its several sources of supply.

The new owner is considering the addition of another machine, increasing production to 200,000 pounds a week. The mill now makes approximately 125,000 pounds a week. The Patchogue-Plymouth Mills Corporation will hereafter use the entire output of the Ashuelot plant.

Harold S. Garfield, who has been with the Ashuelot Paper Company for the past 36 years (30 of which he has been treasurer and general manager), has sold his entire interest in the company and has no definite plans for the present. His son, Russell. who served as a major in the Army in World War Two, and Edward D. Plantier, a veteral of World War One, will be retained by the new ownership as co-managers.

The Ashuelot company was founded in 1904 with one machine and 15 employees.

◆

INTERNATIONAL PAPER HAS ACQUIRED CONTAINER CO.

The entire capital stock of Single Service Containers, Inc. has been purchased by the International Paper Company, New York City, according to a recent announcement.

The container company manufactures Pure-Pak paper milk containers in its plants at Philadelphia and Kalamazoo, Michigan. The bleached kraft board used in fabricating this product has been supplied by International Paper Company.

In addition to containers, the Single Service company provides its customers with other materials such as paraffin wax, adhesive, and stitching wire for finishing the containers.

International Paper Company will operate the container plants with the present organization of Single Service Containers, Inc., and will continue to serve that company's customers.

FLOOD CONTROL MEASURE PASSED BY HOLYOKE

Support from a group of paper manufacturers has resulted in passage by the Holyoke (Mass.) board of alderman of an order appropriating $100,000 for the city's incidental expenses in a federal project designed to provide flood protection for the southern section of the city.

Just prior to the war, the Government completed a flood wall along the northern section of the city's Connecticut River waterfront. The northern flood wall provides protection for the Valley Paper Company and several mills of the American Writing Paper Corporation.

The southern project, an extension of the flood wall to cost $1,250,000, will complete the protection of Holyoke paper mills.

Floods have proved disastrous to the Holyoke paper mills, and the management of all mills affected urged the appropriation as necessary to modernization and reconversion. The movement met with considerable resistance when first presented, but the earnest pleas of paper mill executives overcame all objections.

◆

NO LOWER DUTIES ON IMPORTED PAPER SEEN BY IMPORT COMM. TILL 1947

The American paper industry need not fear the anticipated wholesale reduction of duties on imported paper until some time during 1947, according to a report issued to the paper industry by Warren B. Bullock manager of the Import Committee of the American Paper Industry. It had been expected that negotiations for a duty reduction program would have been well under way by the present time, but delays in the United States Government's efforts to hold a fifteen nation conference on the subject have complicated the program. On October 15 the Preparatory Committee for the proposed international conference will meet in London and the State Department has announced that it will not make public the list of items which will come up for consideration until after that committee's meeting.

After the so-called "bargaining list" is announced, American industry will have at least sixty days in which to present its views in written briefs, another period of from two to four weeks will elapse before oral hearings are conducted and not until after these hearings will actual negotiations be started.

Meanwhile, however, the Import Committee is collecting and organ-

A PERFECT PERFORMANCE CALLS FOR CONTROL

On the mound a winning performance depends upon a pitcher's control—his ability to keep speed and skill coordinated. Likewise, perfect performance of paper board for gloss ink printing depends upon a smooth, even finish that will control ink penetration. For a faultless printing surface, KELGIN has proved a superior surface sizing agent . . . assuring unequalled results. Penetration of printing ink oils and waxes is fully controlled . . . brilliant, "live" colors, high gloss and a smooth, dense surface are assured.

KELGIN, the modern algin sizing agent, is readily . . . quickly . . . economically applied. It is excellent for waterbox application in the calender stacks. KELGIN is readily soluble in both hot and cold water . . . is simple to use. KELGIN will not cause foaming—picking—sticking to the rolls.

KELGIN—a product of Nature processed to exact specifications to provide consistently uniform results—is free of impurities. It is amazingly inexpensive—actually saves you money in many ways. Consult our Technical Staff—they are always ready to help you solve your surface sizing problems. Just drop us a line—there's no cost or obligation.

KELCO COMPANY

75 E. Wacker Drive
CHICAGO-1

31 Nassau Street
NEW YORK-5

530 W. Sixth Street
LOS ANGELES-14

Cable Address: KELCOALGIN

izing the data which will be presented at both the oral hearings and for written briefs to demonstrate the dangers to American investments and labor through any further reductions in duty rates. As one example, the situation as to printing papers will be cited. In 1938, imports of such papers were about 9,000 tons. With a 40 per cent duty reduction, imports are now running at a rate of from 4,000 to 5,000 tons per month. The proposed conferences might involve a reduction up to 50 per cent of the already too-late duty rates on such papers. Comparable situation exist as to other grades.

BRIEFS

▶▶▶ SPECIAL INVENTORY limits on newsprint were removed by the CPA on June 30. At the same time, all import controls on paper were revoked. Hereafter, newspaper publishers will be subject only to the supply curbs which govern other scarce materials—that the users keep on hand no more than "a minimum practicable working inventory." North American mills have boosted output in five months 24.7 per cent over the same period of 1945. Canada expects to produce 10,000 tons more a month in the last half of 1946. Import controls were lifted because of an agreement that this country would not draw on Scandinavian sources of paper has expired.

◆

▶▶▶ FOREST FIRES in Wisconsin destroy 7,567 acres annually, however, reports of the United States Forestry Service show that this is the best record of any of the north central states. The total acreage of Wisconsin is exceeded only by Michigan and Minnesota. The annual fire loss of the former state is less than the losses of the eight states in the region. Illinois is second with an annual loss of 13,778 acres but in total acreage of forest lands Illinois has one-seventh the acreage of Wisconsin.

◆

▶▶▶ THE MILLIONTH TON of pulp produced by the Weyerhaeuser Timber Company's pulp division at Longview, Washington, was produced in June. This is the fifteenth year of operation of the pulp division. At present the rate of pulp output is 275 tons daily.

◆

▶▶▶ THE SANCTION of the CPA has been granted for the renovation program of the Parsons Paper Company, Holyoke, Massachusetts. This company's modernization calls for a total expenditure of $1,100,000. Some $600,000 worth of equipment was purchased some time ago, but could not be installed owing to wartime construction regulations.

◆

▶▶▶ FIRE DAMAGE estimated at $100,000 was suffered by the Putney Paper Company and the Greenview Tissue Company of Putney, Vermont. The Putney Paper Company manufactures tissue paper which the Greenview Tissue Company converts to paper napkins.

◆

▶▶▶ AN EXPANSION program intended to increase the output of the American Can Company's milk containers has begun. The planned development entails an expenditure of $4,500,000 and includes new plants to be built at Maywood, Illinois, Brooklyn, New York, Jersey City, New Jersey, and San Francisco.

Can you top this PERFORMANCE?

175,200 trouble-free pumping hours

• • • This is the record set up by a Warren Single Stage, Double Suction, Centrifugal Pump at the plant of The Phenolite Company, Kennett Square, Pa. This is based upon twenty years of continuous 24-hours-a-day, 7-days-a-week service. The pump, of necessity, is located in a pit 10 feet in depth, with six inches of water in the bottom and plenty of moisture on the side-walls. A tough job, requiring a tough pump—yet over this long period the user says the only maintenance has been an occasional packing! Other Warren Pumps at Phenolite, and elsewhere, perform equally well.

If you have a pumping problem involving:

- ☐ Pulp Stocks
- ☐ Liquor Pumps in Sulphite, Soda and Kraft Mills
- ☐ Water Pumps for Mill Supply, Showers, White Water, Washdown, etc.
- ☐ Boiler Feed and all Power Plant requirements

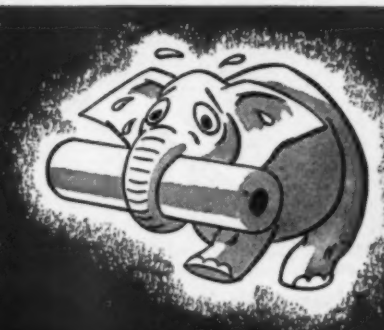
or other services, your inquiry will receive prompt attention.

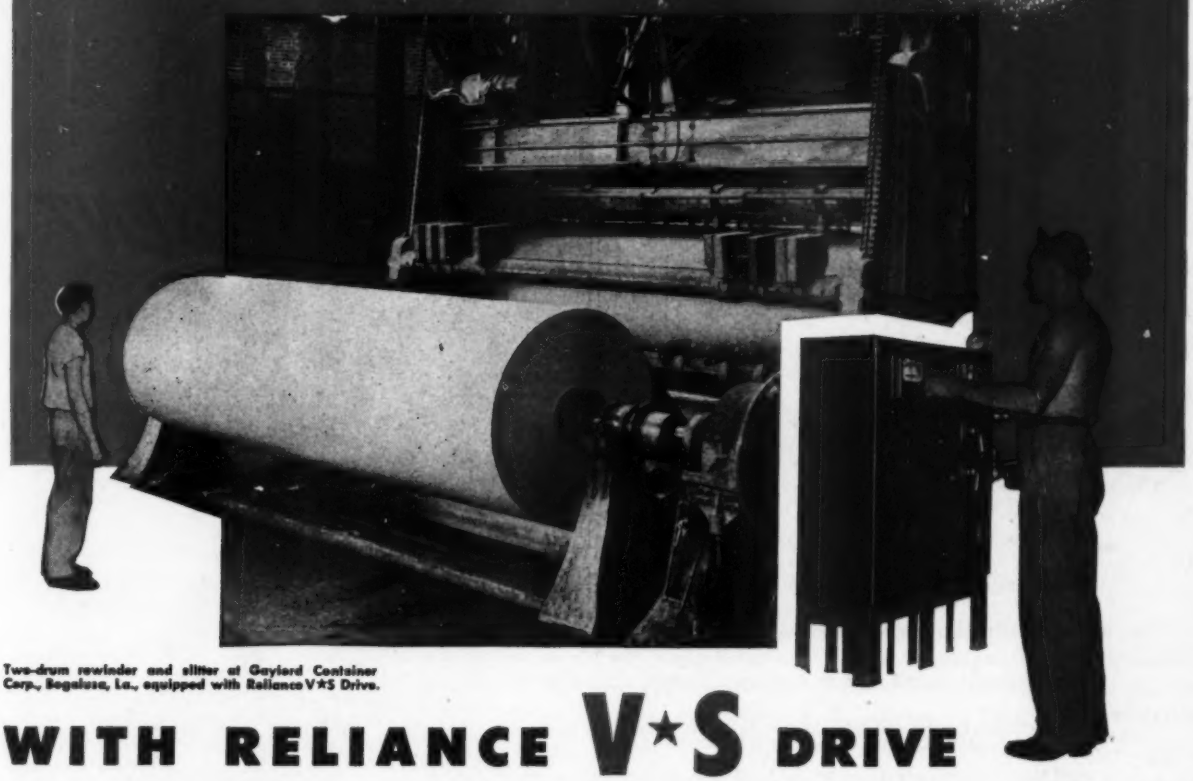
For Greater Dependability, Longer Life, Lower Maintenance

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC. WARREN, MASSACHUSETTS

HANDLING JUMBO ROLLS ECONOMICALLY





Two-drum rewinder and slitter at Gaylord Container Corp., Bogalusa, La., equipped with Reliance V*S Drive.

WITH RELIANCE V*S DRIVE

Jumbo rolls of paper 200 inches wide are rewound and slit in a single operation which produces up to 10 smaller rolls all ready for shipment. Here's *real money-saving efficiency*—made possible by a giant machine equipped with a multi-motored Reliance V*S Drive.

V*S, the *All-electric, Adjustable-speed Drive operating from A-c. Circuits,* provides quick starts and stops, smooth acceleration and other important advantages along with truly remarkable ease of control. By improving quantity and quality of output, as in so many other paper mill applications, it has more than paid its way. Chances are V*S can make many of *your* operations faster and more efficient. To investigate the possibilities, write today for Bulletin 311—or call the nearest Reliance office.

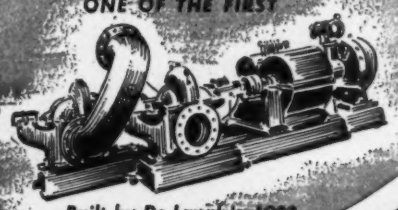
RELIANCE ELECTRIC & ENGINEERING CO.
1078 Ivanhoe Road • Cleveland 10, Ohio

RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

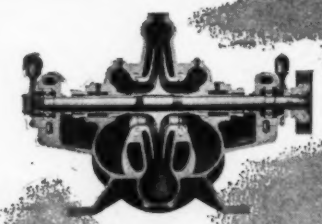
45 Years of PUMP IMPROVEMENT

ONE OF THE FIRST

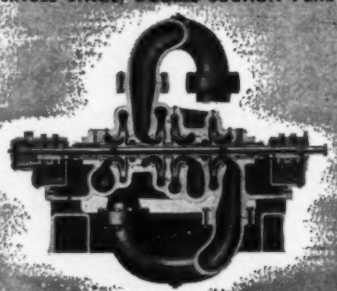


Built by De Laval in 1902

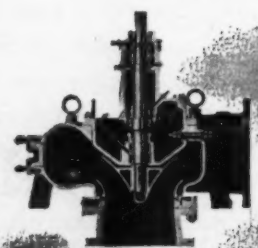
Modern De Laval centrifugal pumps represent the culmination of more than 45 years of continual improvement and perfection. This long period of concentration upon the problems of centrifugal pump design and application places at the user's command a complete line of modern, high quality pumps and a vast store of knowledge concerning pump application problems.



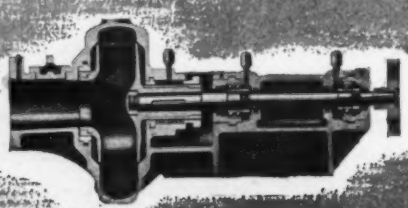
SINGLE STAGE, DOUBLE SUCTION PUMP



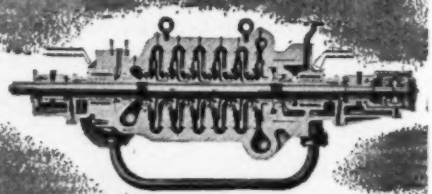
FOUR STAGE, OPPOSED IMPELLER PUMP



MIXED FLOW PUMP



CLOOLESS PUMP



HIGH PRESSURE, MULTI-STAGE PUMP

GP-1

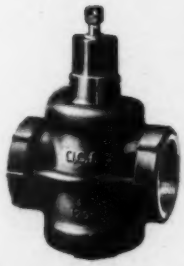
TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

DE LAVAL

STEAM TURBINE COMPANY
TRENTON 2, NEW JERSEY

SALES OFFICES: ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER • DETROIT • DULUTH • EDMONTON • GREAT FALLS • HAVANA • HELENA • HOUSTON • KANSAS CITY • LOS ANGELES • MONTREAL
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA • VANCOUVER • WASHINGTON, D. C. • WINNIPEG

Unrestricted full flow All ways

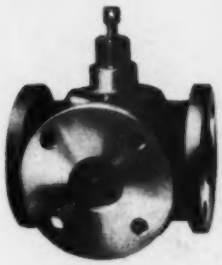


SCREWED

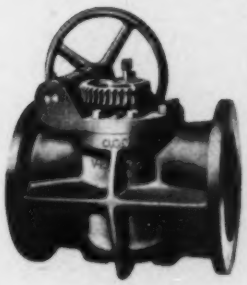
SPUR GEAR OPERATED

FLANGED

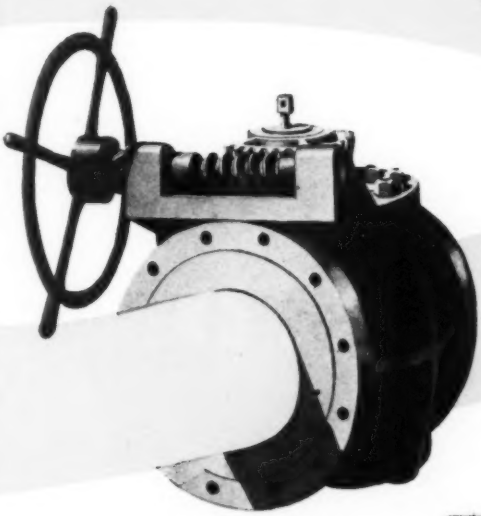
ROUND PORT

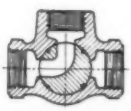


THREE WAY

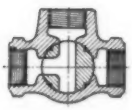


WORM GEAR OPERATED

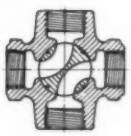




THREE WAY TWO PORT



THREE WAY THREE PORT



FOUR WAY

WHETHER you have a valve application that calls for single or multi-port construction... screwed or flanged connection... wrench or gear operation—you can always count on a.c.f. Lubricated Plug Valves to deliver the optimum in unrestricted, full flow service.

Every a.c.f. Lubricated Plug Valve is designed for maximum operating speed and efficiency, with a well-proportioned full-pipe valve area. There are no pockets to permit lodging of foreign matter or material in suspension. Straight-through flow avoids the abrasion that shortens service life. Again, seating surfaces are tightly sealed away-from-flow in the open position preventing wear.

a.c.f. Lubricated Plug Valves are ideally suited for the efficient handling of all types of processing and industrial plant ladings, and are available in semi-steel, bronze, and other metals. If you are not already aware of the advantages and economies of a.c.f. Valve installations, write for Catalogue 3-(PI)-or call in the a.c.f. sales representative nearest you.

REPRESENTATIVES IN PRINCIPAL CITIES

a.c.f. LUBRICATED PLUG VALVES

AMERICAN CAR AND FOUNDRY COMPANY

Valve Department; 30 Church Street, New York 8, New York

ARE YOU INTERESTED IN
HIGHER YIELDS TO SAVE WOOD
AND TO LOWER YOUR COSTS? IF SO

Continuous

BEATING AND REFINING

by

SUTHERLAND

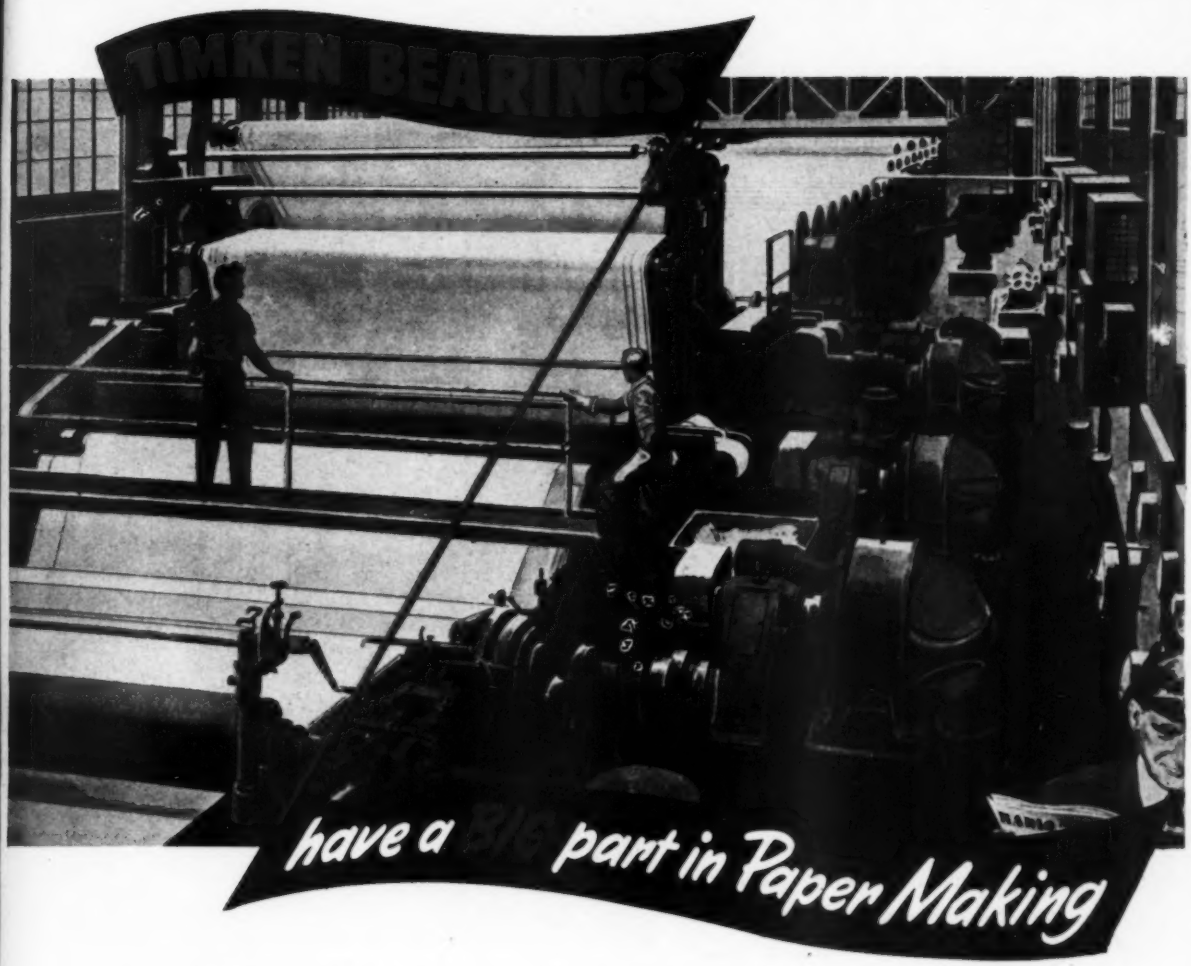
CAN DEFINITELY HELP
YOU ACCOMPLISH BOTH

S R

SUTHERLAND REFINER CORPORATION

TRENTON, NEW JERSEY · *Manufactured in the United States by Valley Iron Works Co., Appleton, Wis.*

SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P.Q., *Manufactured in Canada By The John Bertram & Sons Co. Ltd., Dundas, Ontario*



Bearings are important in paper making equipment of all kinds —from pulpers to supercalenders. The right kind of bearings can increase production; decrease costs; improve quality.

That is why, throughout the paper industry, Timken Tapered Roller Bearings are used and preferred wherever wheels and shafts turn in many leading makes of paper mill machinery.

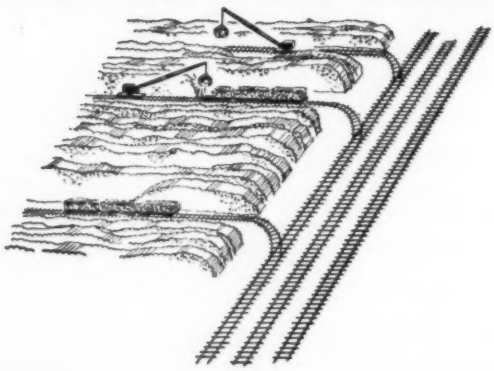
Timken Bearings have all the abilities bearings must have to be able to meet successfully the varied and severe service encountered in this field. They reduce friction to the verge of elimination; carry radial, thrust and combined loads; hold moving parts in constant alignment be operating conditions what they may.

Thus machines can operate faster; are easier to lubricate; have greater endurance; last longer; cost less for operation and upkeep. To be sure of getting all these benefits in your equipment, make sure the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TAPERED ROLLER BEARINGS

Pulpwood: High, Wide and Then Some!

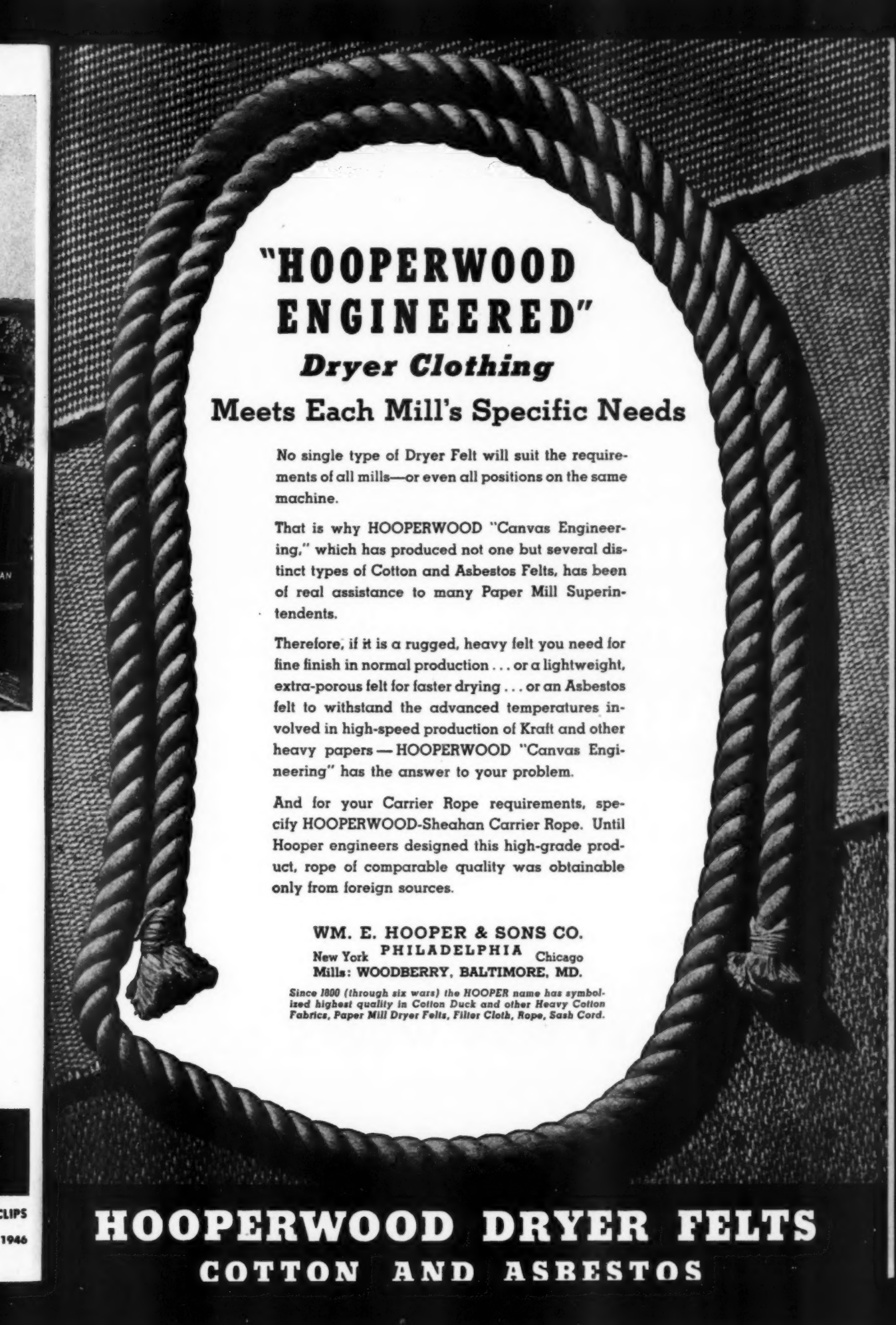
The new "American" Diesel-Electric Locomotive Crane makes rail-served pulp storage yards and stock piles more economical and convenient than ever before. And this efficient smooth-operating unit is the perfect answer to the private switching problem — powerful, easily controlled, smooth starting, fast moving, sharp turning. It is a most flexible and durable pulpwood-handler — engineered by "American" experts to handle more, for less, every working day. It piles high and wide and works safely inside buildings and out — is smoke and spark-free. Study all *your* storage requirements in the light of this new "streamliner of the storage yards." Individually designed diesel, gasoline and steam models are also available.

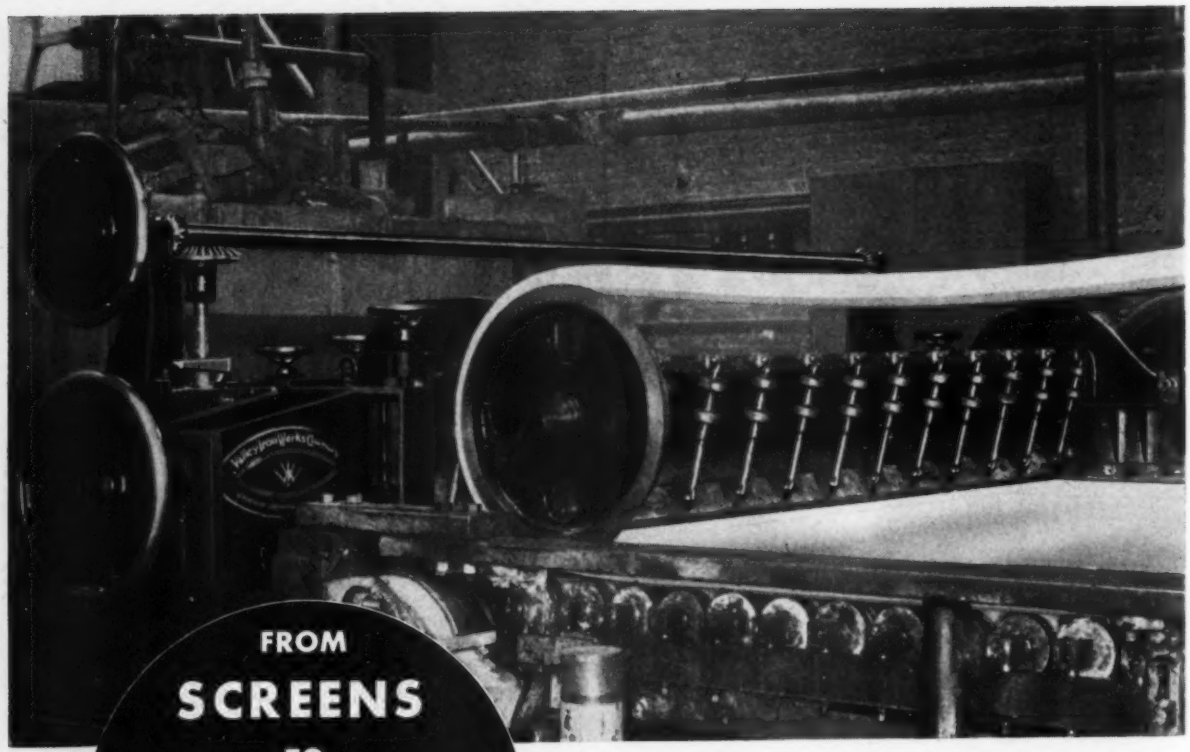


AMERICAN

AMERICAN
HOIST & DERRICK CO.
St. Paul 1, Minnesota
CHICAGO NEW YORK SAN FRANCISCO

REVOLVERS **LOCOMOTIVE CRANES** **HOISTS** **DERRICKS** **BLOCKS AND SHEAVES** **CROSBY CLIPS**


"HOOPERWOOD ENGINEERED"
Dryer Clothing
Meets Each Mill's Specific Needs
No single type of Dryer Felt will suit the requirements of all mills—or even all positions on the same machine.
That is why HOOPERWOOD "Canvas Engineering," which has produced not one but several distinct types of Cotton and Asbestos Felts, has been of real assistance to many Paper Mill Superintendents.
Therefore, if it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers — HOOPERWOOD "Canvas Engineering" has the answer to your problem.
And for your Carrier Rope requirements, specify HOOPERWOOD-Sheahan Carrier Rope. Until Hooper engineers designed this high-grade product, rope of comparable quality was obtainable only from foreign sources.
WM. E. HOOPER & SONS CO.
New York PHILADELPHIA Chicago
Mills: WOODBERRY, BALTIMORE, MD.
Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope, Sash Cord.
HOOPERWOOD DRYER FELTS
COTTON AND ASBESTOS



FROM
SCREENS
TO
BREAST ROLL
BY
VALLEY

A Special Design for Rag and Heavyweights

This little inlet-headbox combines the best in old established paper-making experience with modern VALLEY know-how.

- **Deckles in while running.**
- **Saves valuable wire length.**

VALLEY has an inlet for *Your* Paper Machine.

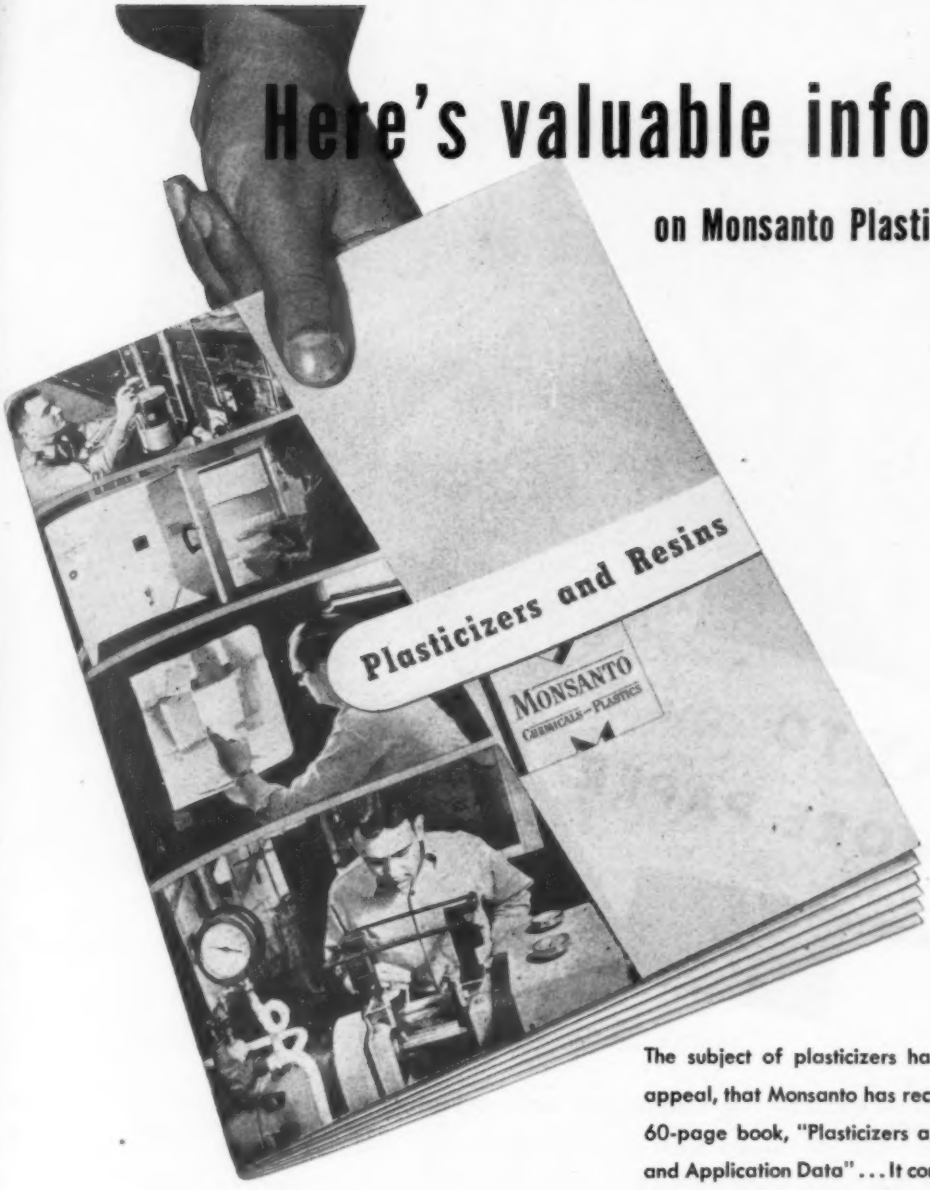
VALLEY IRON WORKS, CO.,

Appleton, Wisconsin

Slices and Head Boxes • Screw Presses • Micro-Mist Spray Dampeners • Laboratory Equipment
Pulp Washing Systems • High-Speed Beaters • Breaker Beaters • Vortex Beaters • Plug Valves
Flat and Rotary Screens • Thickeners • Deckers • Paper Markers • Roll-Headers

Here's valuable information

on Monsanto Plasticizers and Resins



The subject of plasticizers has such wide and general appeal, that Monsanto has recently revised and issued a 60-page book, "Plasticizers and Resins — Specifications and Application Data" . . . It contains much detailed information of considerable daily value — suggested uses, specifications, descriptions, tables, graphs, and various data on flash points, viscosities, pour points, solubilities . . . A copy will be sent promptly on request. Contact the nearest Monsanto District Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

Some Suggested Uses for Monsanto Plasticizers

Alkyd Resins • Benzyl Cellulose • Cellulose Acetate • Cellulose Acetobutyrate • Cellulose Acetopropionate • Chlorinated Rubber • Ethyl Cellulose Natural Resins • Neoprene • Nitrocellulose Phenolic Resins • Polystyrene • Polyvinyl Acetate Polyvinyl Butyral • Polyvinyl Chloride • Polyvinyl Formal • Protein Compounds (Soybean or Corn Protein, Casein, Glue) • Santolite Resins • Urea Formaldehyde Resins.

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

ONE WAY TO MAKE MORE PAPER

is to put a Vickery Felt Conditioner on every press felt. It keeps the felt clean and open right through the week. You don't have to shut down the machine for felt wash-ups, and you don't have to take the weights off the presses and slow down toward the end of the week.

Vickery Conditioners mean more uniform paper finish and save money by removing water at the presses instead of the dryers.

Better make sure all your felts are in condition to make the most paper. If any are unconditioned, get in touch with Bird Machine Company, South Walpole, Massachusetts.

THE VICKERY FELT CONDITIONER

EDITORIAL

The Passing of OPA

▶▶▶ WHEN PRESIDENT TRUMAN vetoed the bill designed by Congress to extend the life of OPA for a year, in one swoop, price control on commodities came to an end and automatically terminated the jobs of some 34,000 bureaucrats. Thus, since July 1, the paper industry and all other industries in this country, have been operating under the free enterprise system. As to whether the OPA will be restored by congressional action in the near future, there exists much doubt.

The people of this country have had enough of the mismanaged and senseless administration of rationing and pricing of their commodities. They assented to rationing and OPA's pricings. They accepted them as a necessary part of the win-the-war effort. But now, thirteen months after V-E Day and ten months after V-J Day, the producers and consumers of commodities believe that all such war controls should cease.

The President's veto of the OPA extension bill brought OPA to a sudden and dramatic end. We are now operating on the prewar basis of demand and supply for the first time since 1942.

Since July 1, the producers and consumers, so suddenly and unexpectedly liberated by the over-night action of our piqued President, have given a fine exhibition of national self control. Consumers have not rushed to market to buy and producers have not hiked their prices to inflationary figures. On the contrary, more abundant supplies of food, meat, and merchandise are daily rushing to market from the producers and the consumers are being assured daily of constantly growing supplies and better qualities at proper prices. Instead of price control by OPA, the national economy is under the control of the producers and consumers of the country.

That is as it should be. It is the free enterprise system that has brought national prosperity to the United States. That system is again operating most efficiently and, in times which are the real test of the ability of the people of the United States to manage their own affairs, better than under bureaucratic control.

All the scares and dire predictions of the OPA propaganda have been of no avail. Business is stable; the country is proceeding toward reconversion in an orderly manner, thereby proving that OPA controls are unncessary. It will take time to remedy all the harm to the free enterprise system which the OPA administration has done to it.

The people of the country appreciate their liberation from OPA control. They will never tolerate it again.

The paper industry has met the issue calmly. Prices have remained firm and show no indication of any unwarranted advances. The demise of OPA has not brought one ton more of paper onto the market. The paper industry has been and still is in an oversold position. That status will remain for some time to come.

In the meantime, although demand and supply are greatly out of balance, the producers of paper products can be counted upon to work out that problem in due time without inflationary harm to their consumers. These are the days that call upon every man to operate with sanity, sense and honesty.

"A Challenge to Management and Labor"

▶▶▶ HOW HAVE THE achievements of American business been brought about? What is the big need of the country today?

These questions and many others were taken up by Alfred Schindler, Under Secretary of Commerce, on June 25, 1946, in an address before the 63rd Annual Convention of the National Confectioners' Association. The address was entitled A Path to Peace in Industrial Disputes—A Challenge to Management and Labor.

Covering a few of Mr. Schindler's remarks, he said:

"Americans as a whole will never stop trying to improve the technique of production and distribution . . . The methods of yesterday are never quite sufficient for the needs of today, and so we devise something new and better for tomorrow.

"Never can it be said of American business that it has sat back and rubbed palms together in pleasurable anticipation of better things to come. It has gone out and worked for its achievements every foot of the way. That is why American industry has been a unique and tremendous social force—a social force possessed of the unswerving purpose of bringing more goods and more satisfaction to more people than any other system is capable of doing. This is what we mean when we talk of the 'American Way!'

"Democracy lives on a mutuality of interest. It thrives on tasks to be performed for thee benefit of the majority. It does not live on fears for tomorrow. It is only when some Americans lose sight of their mutual interest in the 'American way' that fear for tomorrow permeates the very soul of our country.

"What our country painfully needs today is the development of better human relations among its citizens. Business must revise its thinking with regard to labor—adopt a more modern attitude towards its workers. Likewise, labor must revise its thinking with regard to business and accept its obligations—yes, and its opportunities—for achieving industrial unity and national prosperity.

"Neither labor nor management should wittingly or unwittingly drive the American people into distrusting classes. Nor must they foment the kinds of suspicions which have led in so many other countries to revolutions of the right or of the left.

"It must be understood that lasting benefits—benefits to both management and labor, and to the nation—lie in efficient mass production at low unit cost.

"The solution to the challenge facing labor and industry and the American Public is not in passing another law or a dozen laws. America's progress along the road to a greater future will be slow indeed if it must hobble along solely on Government crutches.

"When the point is reached where differences between management and labor, in any industry, are resolved within the industry itself, then we have modern, advanced, management-labor relations."

The Turbo—Encabulator

WILLIAM SIBLEY

▶▶▶ NOW THAT WARTIME security regulations have relaxed, the OPA is dead, Chester has cracked his own Bowles, and the Atom Bomb has established definite limits to Admiral Nimitz, it is high time to give belated recognition to the development and perfection of the Turbo-Encabulator, a new machine, scientifically developed for modern industry during the trying period of reconversion from both GPU and CIO.

For a number of years work has been progressing in an effort to bring to perfection the crudely conceived idea of a machine that would not only supply reactive current for use in unilateral phase detractors, but would also be capable of automatically synchronizing cardinal grammeters. Such a machine is the "Turbo-Encabulator." Basically, the only new principle involved is that instead of power being generated by the relative motion of conductors and fluxes, it is produced by the modial interaction of magneto-reluctance and capacitative directance which has high thixotropic properties.

The original machine, developed under the sound principle of antidisestablishmentarianism had a base-plate of prefabulated amulite, surmounted by a malleable logarithmic casing in such a way that the two spurving bearings were in direct line with the pentametric fan. The latter consisted simply of six hydrocoptic marzelvanes, so fitted to the ambigacient lunar waneshaft that side fumbling was effectively eliminated. The main winding was of the normal lotus-o-delta type, placed in panendermic semi-boloid slots in the stator by the foreman whose vocal inflections were basso-profundo-disgusto.

Naturally every seventh conductor was connected by a non-reversible termic pipe to the differential girdlespring on the "up" end of the grammeters.

Forty-one manestically spaced grouting brushes were arranged to feed into the rotor slip-stream a mixture of diathermic S-value phenylhydrobenzamine and 5-per centum reminative terliohexamine. Both of these liquids have specific precosities given by $P = 2.5C_n$ 6.7 where n is the diathetical evolute of retrograde temperature phase disposition and C is Cholmondeley's annular grillage coefficient. Initially, n was measured with the aid of a metapolar refractive pilfrometer, but due to its superuncontradistinguishabilitiveness, up to the present date nothing has been found to equal the transcendental hopper dadoscope.

Electrical, ceramic and paper and pulp engineers and chemists will appreciate the difficulty of nubing together a regurgitative purwell and a supramative wennel-sprocket. Indeed, this proved to be a stumbling block to further development until, during 1942, it was found that the use of anhydrous nangling pins enabled a kryptonastic bolling shim to be successfully attached to the tankered. Its high resistance to electrolysis was brought about through the new alloy largely composed of molybdenum, manganese and chrome properly fused with collodial corriation.

The early attempts to construct a sufficiently robust spiral decommutator failed largely because of a lack of appreciation of the large quasi-piestic stresses in the gremlin-studs; the latter being especially designed to hold the roffit bars to the spamshaft. When, however, it was discovered that the wending could be prevented by a simple addition to the living sockets, almost perfect running was secured. The operating point is maintained as near as possible to the h.f. rem peak by constantly homogenizing and fromaging the bituminous spandrels. This is a distinct advance over the standand nivelsheave in that no dramcock oil is required after the phase detractors have remissed and the disiccated fuse boxes have been replaced by odoriferous circuit breaker.

Of course in treating a contaminated mud it is first necessary to remove the calcium ions as an insoluble precipitate. Then reduce the *p*H to approximate the value before contamination, after which redisperse the aggregate as much as possible. Naturally there follows the necessity to replace any colloidal material to its original formation. In practical application the first three of these aims are accomplished simultaneously, whereas the fourth is not usually begun until the *p*H has been reduced to its proper value.

One of the first treatments consists of a mixture, in about equal proportion, of monosodium orthophosphate and one of the complex phosphates, or of sodium acid-resisting pyrophosphate used alone. At this stage in the treatment, the mud usually has a high Marsh funnel viscosity, with a high gel rate. Addition of high bentonite may be begun at this point if the water loss is exceptionally high and there has been considerable interference in suspension, and the repulsive forces have combined to set up thermostaticitis.

Undoubtedly, the turbo-encabulator has now attained a very high level of technical development. It has been successfully used for operating nofer trunnions and hatching glaso purifics. In addition, whenever a barescent skor motion is required, it may be employed in conjunction with a valley-forged reciprocating dingle arm to reduce sinusoidal depleneration. The scientific branch of American industry owes much to the tireless engineers and chemists for the final perfection of the turbo-encabulator—don't you think?

Chain by LINK-BELT

--- a Father to Son craft

The three generations of Link-Belt Chain Makers shown here have many counterparts. Chain making is a father to son craft at Link-Belt . . . a craft that combines skill and pride of workmanship. This skill, trained to an ideal of quality for over seventy years, has a direct relationship to chain performance on your job.

There is a correct Link-Belt Chain and Sprocket for every conveying and power transmitting service. The advice of Link-Belt engineers is available to you.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities.

LINK-BELT

CHAINS AND SPROCKETS

for conveyors • for drives • for power transmission

"SS" Class Short Pitch. For medium and heavy duty drives.

Ewart Detachable Link-Belt. A widely used chain for average service on drives, elevators and conveyors.

10,289C

Silverlink Finished Steel Roller Chain for drives and conveyors.

"C" Class "Combination". For heavy-duty elevators handling sticky or semi-abrasive materials.

"SS" Class Without Rollers. For heavy-duty elevators and conveyors not requiring roller type chain.

TITANOX . . . *the brightest name in titanium pigments*

For many years, the Paper Industry has been using TITANOX pigments for whitening paper stocks and making them opaque. TITANOX pigments have done an outstanding job because of their qualities of high refractive index, pure white color and unusually high brightness. The fineness and uniformity of TITANOX pigments make for easy dispersion. They have extreme resistance to after-yellowing.

In tinted stocks, TITANOX is used for outstanding clarity and retention of color.

TITANOX pigments are economical, too. A little pigment goes a long way.

The accelerated demand for these top quality pigments has far surpassed the supply. The makers of TITANOX pigments—the largest producers of titanium pigments in the United States—are endeavoring to increase production by keeping their existing plants at full capacity and also by expanding their facilities.

TITANOX

TRADE MARK

TITANIUM PIGMENT CORPORATION

SOLE SALES AGENT

111 Broadway, New York 6, N. Y.

350 Townsend St., San Francisco 7, Cal.

COOPER and stainless steel are twins!

Cooper's intensive study of stainless steel castings has been "on the record" since the earliest days of commercial use of stainless steel. In the past quarter of a century, progressive developments in casting techniques, metallurgical controls and advanced methods of inspection have made possible our growth to the largest exclusive stainless steel foundry in the country.

As a result, Cooper now offers the purchasers of stainless steel castings new methods and continued improvements in machine molding, sand control, heat treatment and centrifugal casting.

And we're still growing . . . developing every phase of the business so that you may continue to be assured of the best in stainless steel castings and the best advice on their application.

THE COOPER ALLOY FOUNDRY CO.
125 Bloy Street
Hillside, New Jersey

CA-118

Allis-Chalmers Presents...

"THE CASE OF THE BARKING LOGS"

"Just as they guard against outright theft, many mills protect themselves from greater losses out in their plants."

"Streambarker is compact, saves valuable space. Logs are fed end-to-end in a continuous stream for high capacity."

At 15° below zero logs are unloaded exactly as they are received from the forests . . . require no further sorting."

16 mm. Shows Unit

FILMED DURING SUB-ZERO WEATHER in one of the country's leading Paper mills, "The Case of the Barking Logs" is for many the first *visual* record of major economies being realized today through the use of hydraulic log barking.

In this remarkable new movie you will see *effective, continuous* barking of 8 ft long frozen Spruce, Poplar and Southern pine woods of assorted shapes and conditions. You will see Streambarker *inside and out,* and have its revolutionary principle of operation clearly explained.

"Ready for further processing, logs are discharged by the kick-out action of the rolls."

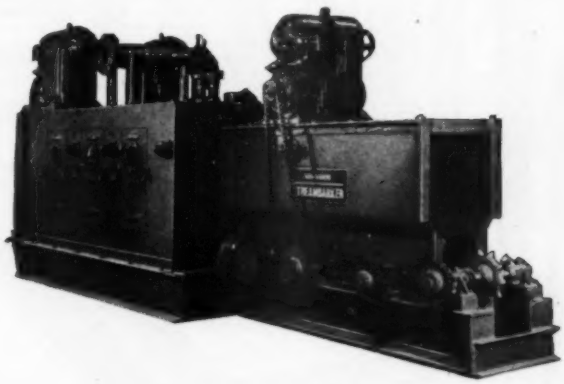
ALLIS-CHALMERS

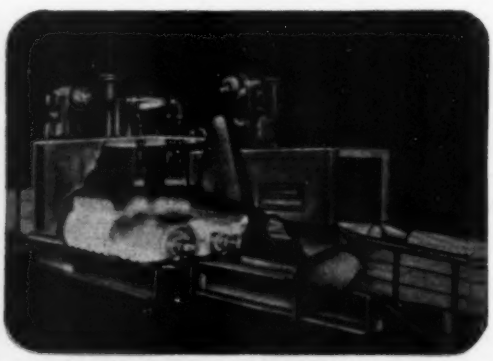
One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

Color-Sound Movie "Streambarker" in Operation!

You will recognize, perhaps more appreciably than before, the important gains which many mills now using Streambarkers are making in their processes. Gains that can be interpreted through elimination of wood loss; simplification of the barking cycle; space savings; better utilization of bark . . . *and in the production of higher-grade pulp and paper.*

At each showing, your audience will receive an 8-page, pocket-size illustrated booklet reviewing the movie. NOTE: this film offer good only in continental U.S.A. ALLIS-CHALMERS, MILWAUKEE. A 2080





"Around 2 principles — mechanical roll action and hydraulic pressure — this modern method of barking has been built."

16 MM. PRINTS FREE

Film runs 10 minutes on 16 mm sound projectors. Copies now available for loan. Mail coupon to Advertising Dept., Allis-Chalmers, Milwaukee 1, Wis.

Name.....

Firm.....

Street.....

City.....**State**.....

Approx. No. People to see Film.....

PREPARATION— Hydraulic Barkers, Chip Screens, Saws, Slashers.

COOKING — Digesters, Blow Tanks, Kilns, Heat Exchangers.

WET ROOM — Vibrating Screens for use as Thickeners, etc.

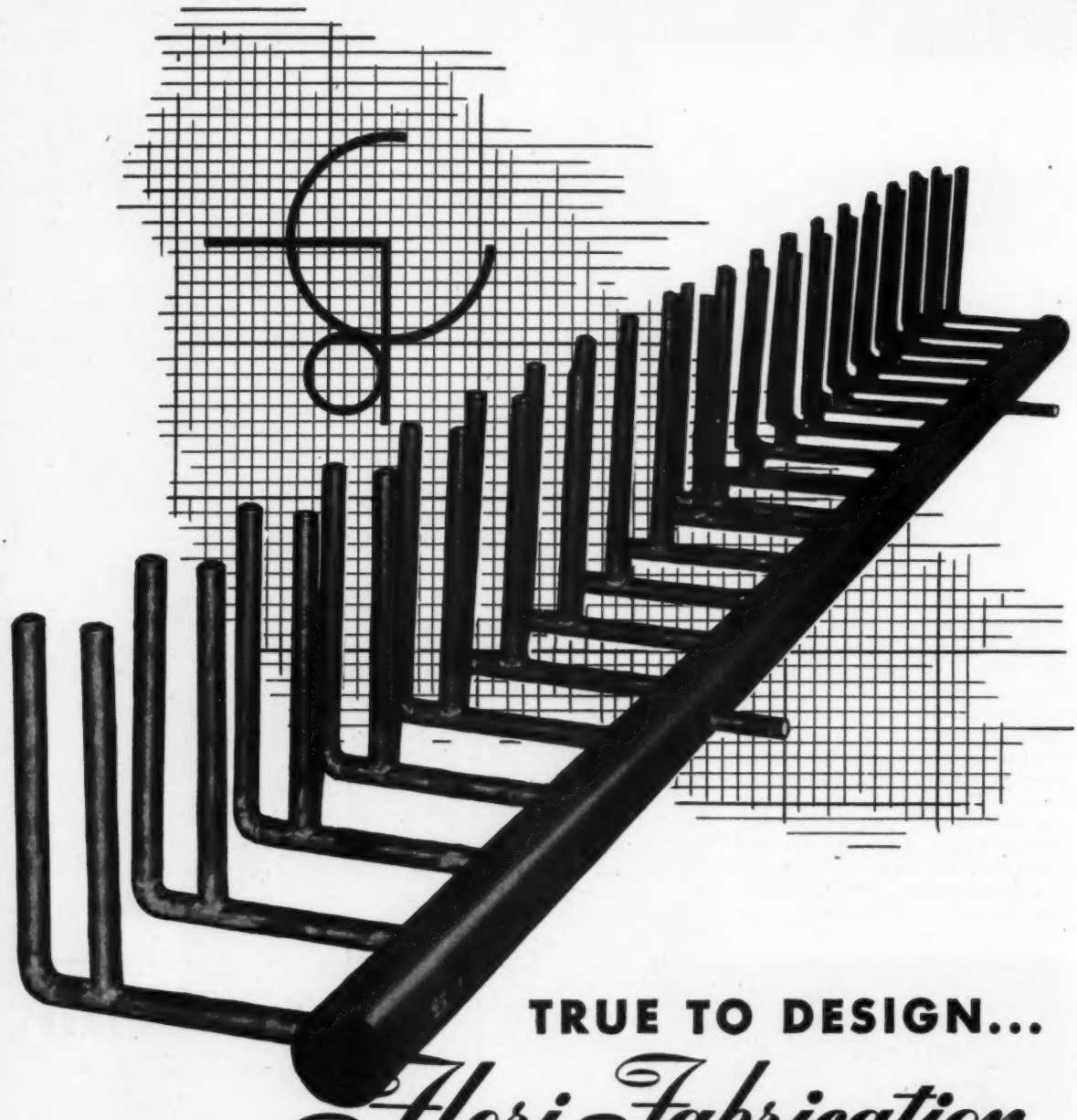
PAPER-MAKING — special drives for Paper Machines, etc.

POWER — Generation, Distribution and Control equipment.

MOTORS — all types a-c and d-c, 1 to 7000 hp—Gearmotors.

TEXROPE V-belt drives to 5000 hp—constant and adjustable speed.

PUMPS — Single and Multi-Stage to 150,000 gpm — Stock pumps.



TRUE TO DESIGN...

Flori Fabrication

Our code-qualified craftsmen specialize in fine tubular and plate steel fabrication of the most intricate precision design, within closest tolerances—

Accurately, Speedily, More Economically

IF IT'S FABRICATION . . . CONTACT FLORI

FLORI FABRICATION

THE FLORI PIPE COMPANY • ST. LOUIS 15 • CHICAGO 47

with 64 years' experience making special chemicals —B&A may have the answer to your problems

Over the past 64 years, Baker & Adamson has helped Industry solve scores of production problems by providing a wide range of fine chemicals "custom made" to the particular requirements of individual users.

Such experience can be invaluable to you, too, if your research, development or production program indicates a special chemical will be needed.

Whether you must have this material "made to order" in tons or pounds, you will find B&A's flexible manufacturing facilities well adapted to countless assignments . . . and your special chemical will be produced with the same skill, science and careful attention that has gained B&A the reputation for "setting the pace in chemical purity" wherever reagents and fine chemicals are used.

Remember—no matter what your needs, the Baker & Adamson Division of General Chemical Company has the men, methods, and materials to handle special chemical requirements swiftly, surely . . . and in strictest confidence.

Let us discuss your problem now so as to dovetail the delivery of your special chemical to the flow of your other production materials.

REAGENTS B&A STANDARD OF PURITY FINE CHEMICALS

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

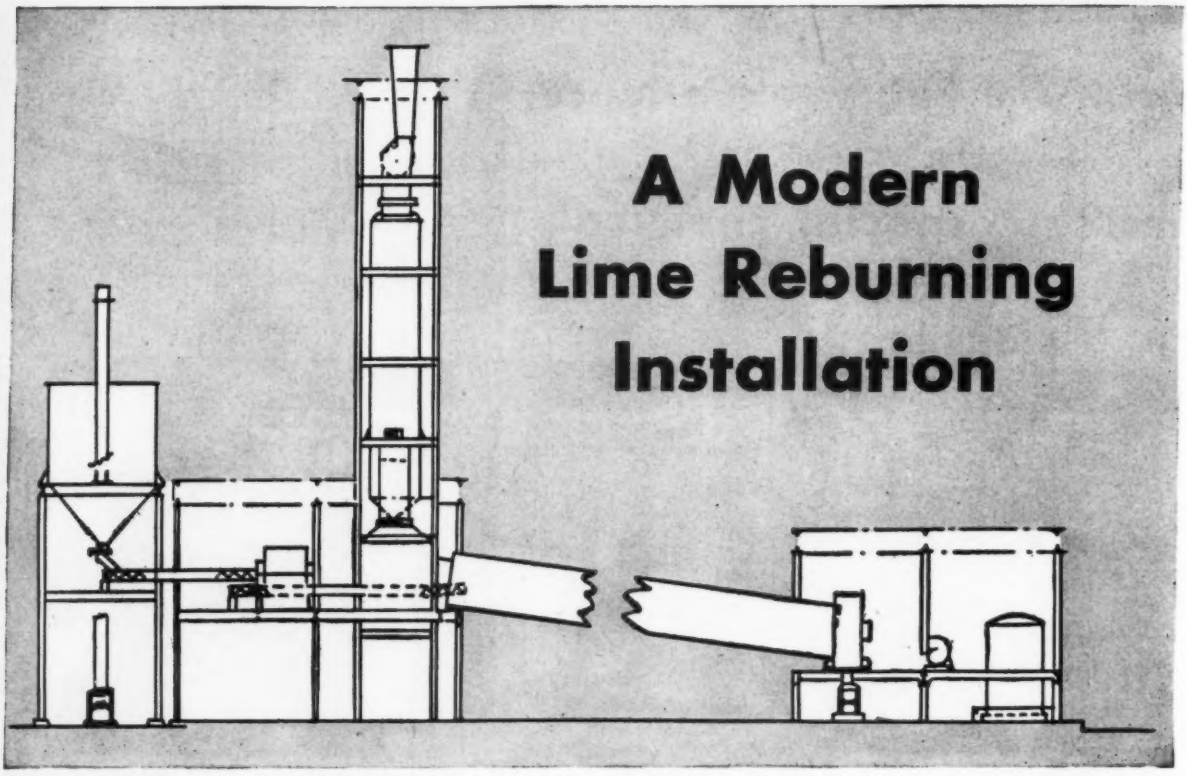
Sales and Technical Service Offices: Atlanta • Baltimore • Birmingham* • Boston • Bridgeport • Buffalo* Charlotte* • Chicago* • Cleveland* • Denver • Detroit* • Houston • Kansas City • Los Angeles* Minneapolis • New York* • Philadelphia* • Pittsburgh* • Providence • St. Louis* • San Francisco* • Seattle Utica • Wenatchee (Wash.) • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks carried here.



A Modern Lime Reburning Installation

THIS new General American Lime Reburning Installation provides an efficient low cost method of getting the most out of limestone and lime sludge.

A rugged motor-generator drive, an improved type air seal, easily aligned rollers and pressure oil system assure trouble-free mechanical operation.

Because all the units—kiln, filter, thickener, scrubber and bins—are built in General American's own shops, you secure the benefits of undivided responsibility for the satisfactory performance of the installation.

Ask for further information on how this new Lime Reburning Installation can improve your operating results.

EQUIPMENT FOR PULP AND PAPER MILLS

EVAPORATORS
DIGESTERS
BLOW TANKS
TURBO-MIXERS
FILTERS
THICKENERS
STORAGE TANKS
BINS
SLAKERS
RECAUSTICIZING PLANTS

General American
TRANSPORTATION CORPORATION
process equipment • steel and alloy plate fabrication

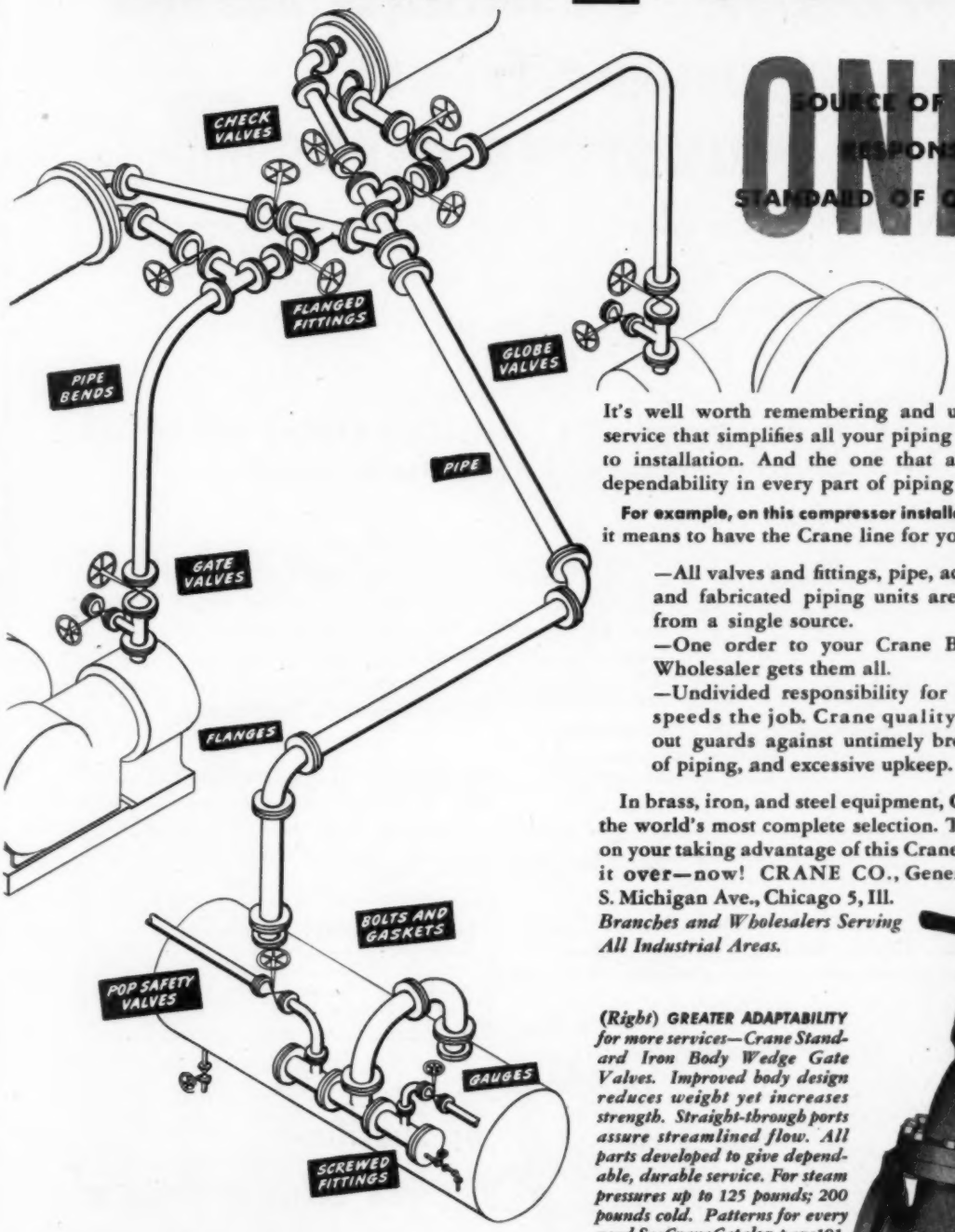
SALES OFFICE:
516a Graybar Bldg., New York 17, N. Y.
WORKS: Sharon, Pa.; East Chicago, Ind.

GAT X GENERAL AMERICAN

OFFICES: Chicago, Louisville, Cleveland, Sharon, Orlando, St. Louis, Salt Lake City, Pittsburgh, Washington, D. C.

WORTH REMEMBERING!...

CRANE Supplies all Piping Materials



ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

It's well worth remembering and using now—the service that simplifies all your piping jobs from plan to installation. And the one that assures uniform dependability in every part of piping systems.

For example, on this compressor installation, look what it means to have the Crane line for your partner:

—All valves and fittings, pipe, accessories, and fabricated piping units are specified from a single source.
—One order to your Crane Branch or Wholesaler gets them all.
—Undivided responsibility for materials speeds the job. Crane quality throughout guards against untimely breakdowns of piping, and excessive upkeep.

In brass, iron, and steel equipment, Crane gives you the world's most complete selection. There's no limit on your taking advantage of this Crane service. Think it **over**—now! CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.

(Right) GREATER ADAPTABILITY *for more services—Crane Standard Iron Body Wedge Gate Valves. Improved body design reduces weight yet increases strength. Straight-through ports assure streamlined flow. All parts developed to give dependable, durable service. For steam pressures up to 125 pounds; 200 pounds cold. Patterns for every need. See Crane Catalog, page 101.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

Through Passenger Service Designed to Meet INDUSTRY'S NEEDS

Here is a new passenger train service ideal for industrial executives making business trips between the East and West Coasts. This no-extra-fare service is 10 to 18 hours faster than previous service between Chicago-St. Louis and the West Coast terminals.

Between NEW YORK-WASHINGTON, D. C. *and* LOS ANGELES-SAN FRANCISCO

• • • •

From New York . . . through sleeping-cars depart on the New York Central and the Pennsylvania railroads. On arrival at Chicago they are carried through to Los Angeles on the Transcon; to San Francisco on the Overland.

From Washington, D. C. . . . through sleeping-cars departing on the Pennsylvania are carried through from Chicago to Los Angeles on the Transcon—to San Francisco on the Pacific. Departing on the Baltimore and Ohio, sleeping-cars are carried through to San Francisco on the Pacific.

Similar service available eastbound from Los Angeles and San Francisco. No change of cars enroute in either direction.

Between ST. LOUIS-KANSAS CITY-DENVER *and* PACIFIC COAST

• • • •

Departing from St. Louis on the new Streamliner "CITY OF ST. LOUIS" through sleeping-cars are routed to Portland-San Francisco and Los Angeles (via Kansas City-Denver) with no change of cars enroute. Similar service is available eastbound from the West Coast.

• • • •

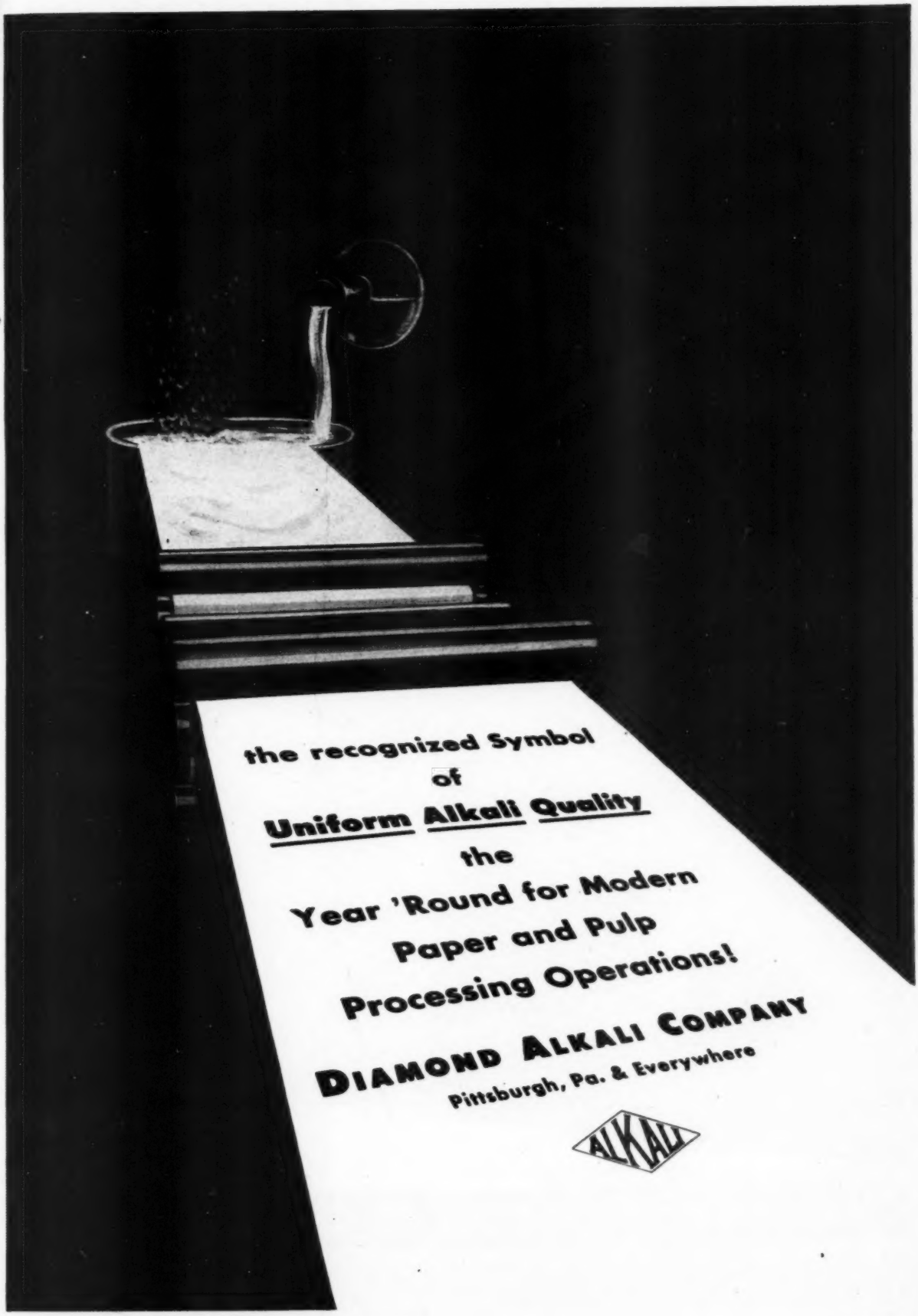
For complete information regarding schedules, accommodations and other passenger service to or from the Union Pacific West, inquire at your local ticket office.

TO VACATIONISTS . . . Union Pacific serves more western scenic regions than any other railroad. These include California, Pacific Northwest, Colorado, Yellowstone and the National Parks of Southern Utah-Arizona.

be Specific – say "Union Pacific"

UNION PACIFIC RAILROAD

ROAD OF THE Streamliners AND THE Challengers


the recognized Symbol
of
Uniform Alkali Quality
the
Year 'Round for Modern
Paper and Pulp
Processing Operations!
DIAMOND ALKALI COMPANY
Pittsburgh, Pa. & Everywhere
ALKALI

REDUCE SCREENING LOSSES AS MUCH AS 40% PER WEEK WITH CRODON PLATING

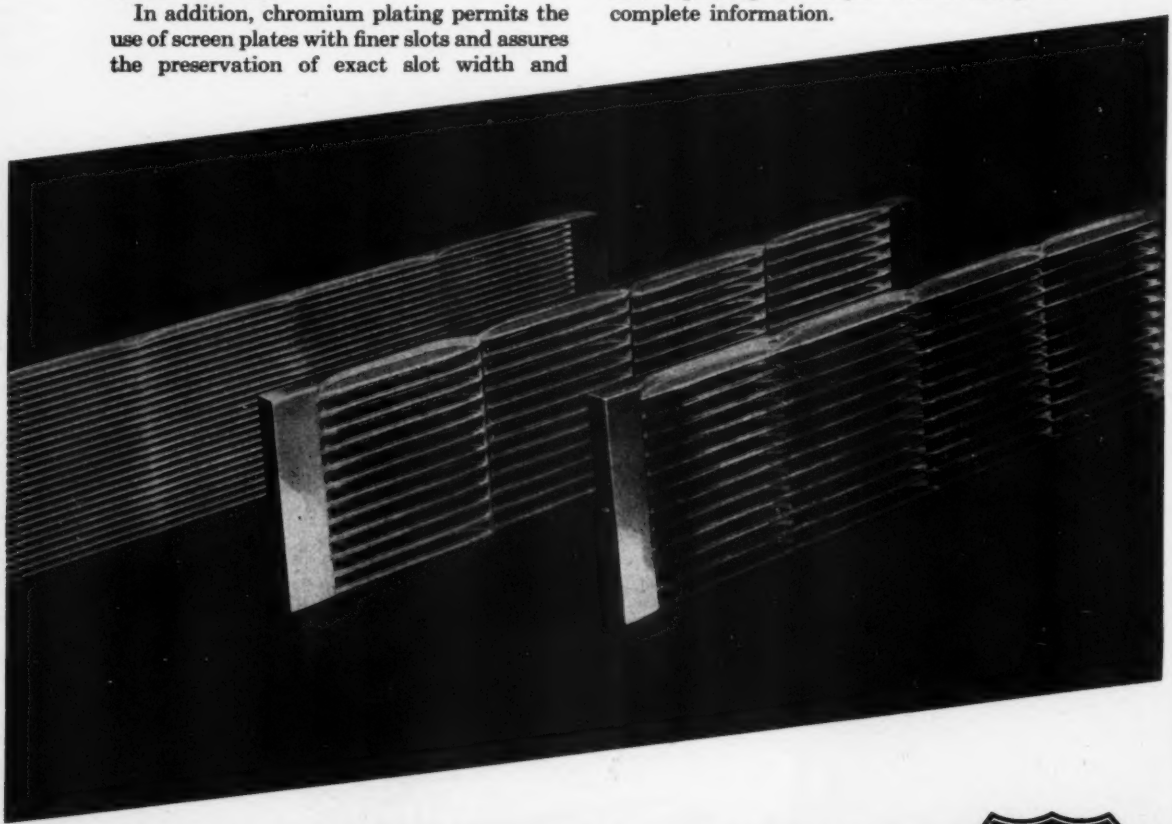
Take a *good* look at your screen plates. If you find them worn, rough and inaccurate... or with badly clogged slots causing heavy losses in screening capacity...you need the benefits of chromium plating.

The screen plates illustrated, for example, have been chromium plated and thus provided with a permanently hard, durable protection against wear and corrosion. The smooth, non-adherent properties of CRODON prevent the filling up or clogging of slots... known to cause losses in screening capacity as high as 40% in one week.

In addition, chromium plating permits the use of screen plates with finer slots and assures the preservation of exact slot width and smoothness. The results: greater production of a higher quality paper... fewer costly delays for cleaning or repairs.

NOW is the time to investigate how chromium plating can increase screening efficiency in your mill. One mill found that chromium-plated screen plates lasted four times as long as plain bronze plates.

By specifying CRODON when you chromium plate equipment, you are assured of the incorporation of all Chromium Corporation of America's skill and experience in electroplating technique. Write today for complete information.



CHROMIUM CORPORATION OF AMERICA

CRODON
The Chrome Plate

EXECUTIVE OFFICES—120 BROADWAY, NEW YORK 5, N. Y.—WORTH 2-6720

346 Huntingdon Ave.
Waterbury 90, Conn.
Waterbury 4-3141

1760 Lakeview Road
Cleveland 12, Ohio
Cedar 6660

4645 West Chicago Ave.
Chicago 51, Ill.
Austin 3716

What the New NORTON PULPSTONE *Markings Mean . . .*

37C546 - M 7 V

ABRASIVE

The letter indicates the kind of abrasive (A, aluminum oxide; C, silicon carbide) and the figure the particular type of that abrasive. Example:

A = Alundum abrasive
38A = 38 Alundum abrasive
37C = 37 Crystolon abrasive

GRAIN SIZE

The grain sizes used in pulpstones range from 16 (coarse) to 180 (very fine). A single size or a combination of sizes are used to suit specific conditions in different mills. The digits following the first letter in the marking indicate the grain size combination.

GRADE
(Hardness)

The grade or hardness of a pulpstone is really a measure of the strength of a bond that holds the grains of abrasive. It is designated by letters and the usual range in pulpstones is from J (soft) to S (hard).

STRUCTURE
(Grain Spacing)

The structure of a pulpstone refers to the relative spacing of the grains of abrasive. In the marking system it is designated by the number following the grade letter, the larger the number the more open the structure. The usual pulpstone range is from 5 to 12.

BOND

The letter following the structure number indicates the kind of bond. In pulpstones it is vitrified bond and is designated by "V". When the letter "P" is used following the "V" it indicates that the vitrified bond is of the large pore type.

The marking system used for Norton Pulpstones is the same as that employed by Norton Company for other types of grinding wheels and is based on the standard system of the Grinding Wheel Manufacturers Association. The typical marking given above, for example, means a pulpstone of 37 Crystolon (silicon carbide) abrasive, grain size combination 54/6, grade of hardness M, structure 7, vitrified bond.

Another typical marking is:
38A202 — 010VP

This means a pulpstone of 38 Alundum (aluminum oxide) abrasive, grain size combination 20/2, grade of hardness 0, structure 10 (open), vitrified bond of the large pore type.

Another example:
A6012 — L7V

This indicates a Norton pulpstone of Alundum abrasive, grain combination 60/12, hardness L, structure 7, vitrified bond.

You can be sure that there are Norton markings to designate the exact stone which you should have for each grinder in your mill.

NORTON COMPANY
WORCESTER 6, MASS.
NORTON COMPANY OF CANADA, LTD.
HAMILTON, ONTARIO

NORTON ABRASIVES

Developing New Products?

Improving Old Ones?

CALL ON WHITTAKER

What grade of material will be best in that new product?

What's the best substitute for an unobtainable pigment?

We have stiff competition to buck. What's better and cheaper than what we've been using?

To help you answer just such questions, the Whittaker Research Division places at your service its extensive facilities and its accumulated knowledge of minerals, colors and pigments.

Whittaker research has helped solve lots of these problems. It has been most active when most needed. In answer to the serious need of the leather, optical, soap, and other industries, for instance, Whittaker discovered, developed and distributed *Valencia* pumice from the large deposit at Grants, New Mexico and this Whittaker product has proved superior to Italian pumice for all purposes.

Whittaker is manned and equipped to accept the challenge of your problems, too. Possibly one or several of the Whittaker minerals, colors and pigments may mean lower cost, faster manufacture or better quality in your products. Let Whittaker research help you find out. Write for full technical data, laboratory samples, or advice. For commercial quantities, place your order with Whittaker, fully assured of getting products that are laboratory tested for uniform high quality.

— Imported pigments and colors have returned —

206

EST. WHITTAKER 1890

Whittaker, Clark & Daniels, INC.

260 West Broadway, New York 13, N. Y. · Plant: South Kearny, New Jersey

SALES REPRESENTATIVES

CHICAGO — Harry Holland & Son, Inc.
PHILADELPHIA — R. Peltz Company
NEW ORLEANS — E. W Ortenbach
MEMPHIS, TENN. — L. E. Offutt Co.
CLEVELAND — Palmer Supplies Co.
TORONTO & MONTREAL — Richardson Agencies, Ltd.

Precision

STAINLESS STEEL WELDING FITTINGS

THE Stainless Steel Division of Pittsburgh Piping offers the largest selection of stainless steel welding fittings produced by any manufacturer. Welding fittings include 180° Return Bends, 45° and 90° Elbows, Reducers, Tees, Caps, and Lap Joint Nipples. I.P.S. sizes range from ½" to 10"; tube sizes from 1" to 24". Fittings are available in Stainless Types Nos. 304, 316, and 347. Other analyses can be furnished on orders for sufficient quantities.

Pittsburgh Piping Stainless Fittings are annealed, blasted, and passivated for best corrosion resistance. The ends are accurately machine cut and beveled to 37½° with approximately 1/16" straight face. The radius of each elbow is 1½ times nominal pipe diameter.

The use of Pittsburgh Piping and Equipment Company Stainless Steel Fittings assures dimensional accuracy in sub-assemblies and greatly simplifies field erection. Write for complete information.

WORLD'S LARGEST PRODUCER OF STAINLESS STEEL WELDING FITTINGS

STAINLESS STEEL DIVISION

Pittsburgh Piping

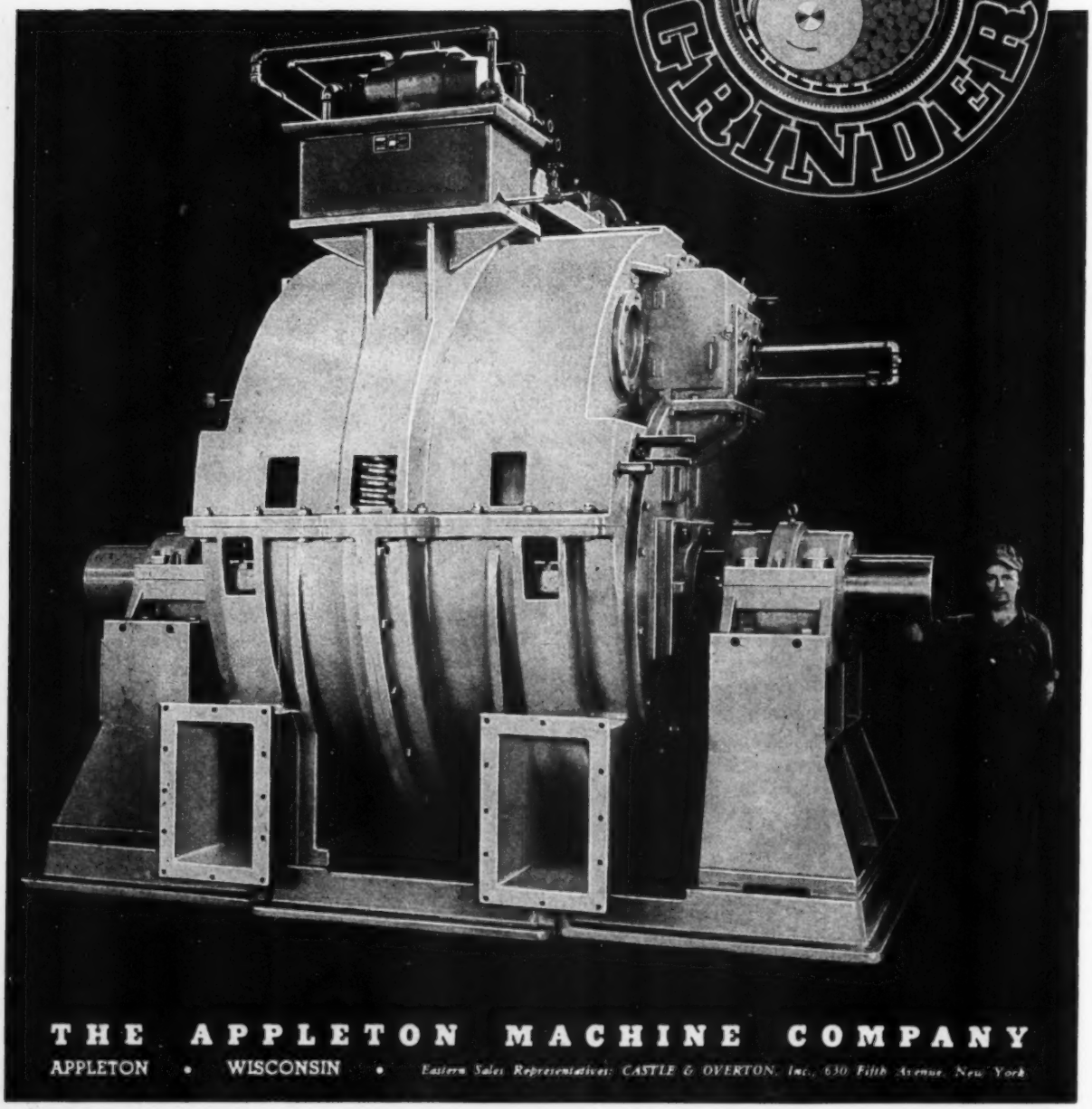
AND EQUIPMENT COMPANY

10 Forty-Third Street Pittsburgh, Penna.

Woolworth Building, New York
Chamber of Commerce Bldg., Indianapolis
Book Tower, Detroit
525 Market Street, San Francisco
634 S. Commerce Place, Los Angeles
Peoples Gas Building, Chicago
Public Square Building, Cleveland
10 High Street, Boston
Heights State Bank Bldg., Houston
Whitehead Building, Atlanta

REPLACES 3 OR 4 POCKET GRINDERS

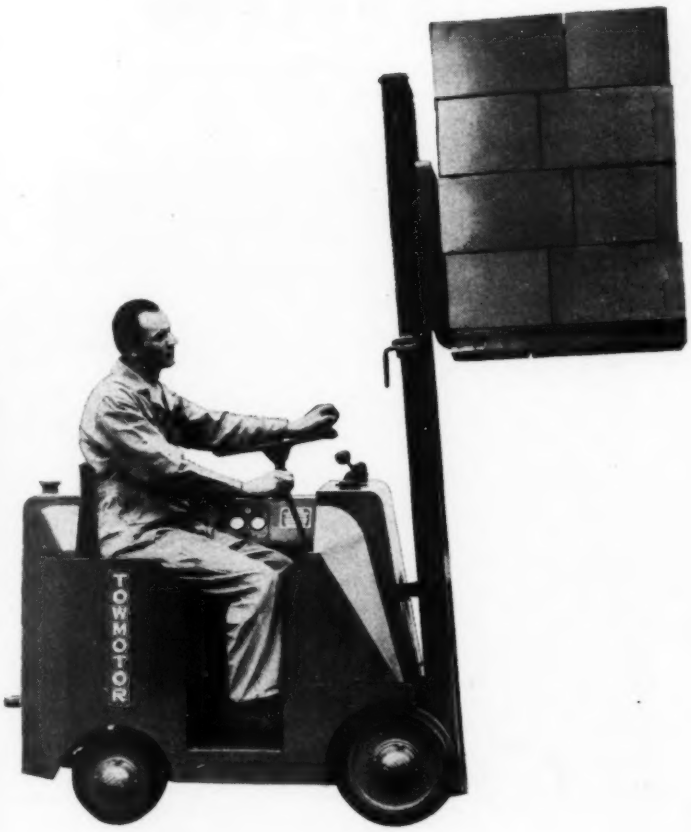
This is one of the six Roberts continuous, high-speed Grinders that are replacing twenty-eight three-pocket grinders in a New York state mill. It grinds four foot wood while two foot pulpwood was used before. The installation of a conveying system combined with the easy loading features of this new grinder practically eliminates all manual handling of the wood. One operator can control the feeding of two adjacent Roberts Grinders. Due to its steady load characteristics it is adaptable for grinding all kinds of pulpwood and readily manufactures all of the grades of pulp required for any groundwood paper or purpose. With easy, accurate control, the many advantages of continuous, high-speed grinding combines with those of hydraulic feed for steady operation with a resulting high quality product. Write for complete information.



THE APPLETON MACHINE COMPANY

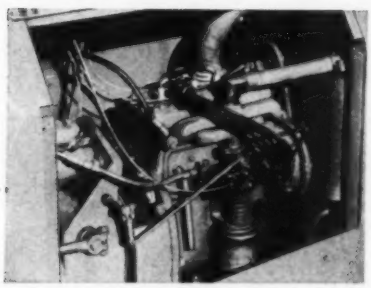
APPLETON • WISCONSIN • *Eastern Sales Representatives: CASTLE & OVERTON, Inc., 630 Fifth Avenue, New York*

Announcing . . .
The New TOWMOTOR LT-35 LIFT TRUCK



Compact and lightweight---makes it economically sound for every industry, regardless of size, to enjoy the advantages of modern, mechanized materials handling.

Unique design provides plenty of clear, accessible space for the operator while retaining small overall dimensions and low center of gravity for maximum stability.



Engine and transmission in the LT-35 are easily accessible for inspection, adjustment and maintenance.

The new Towmotor LT-35 Lift Truck can lift, carry and stack 1500 to 2000 pound loads with ease, yet it is so compact and lightweight that it may, with utmost safety, be operated under full load on freight elevators of limited capacity, on upper floor levels where low load limits are imposed, or directly into motor trucks.

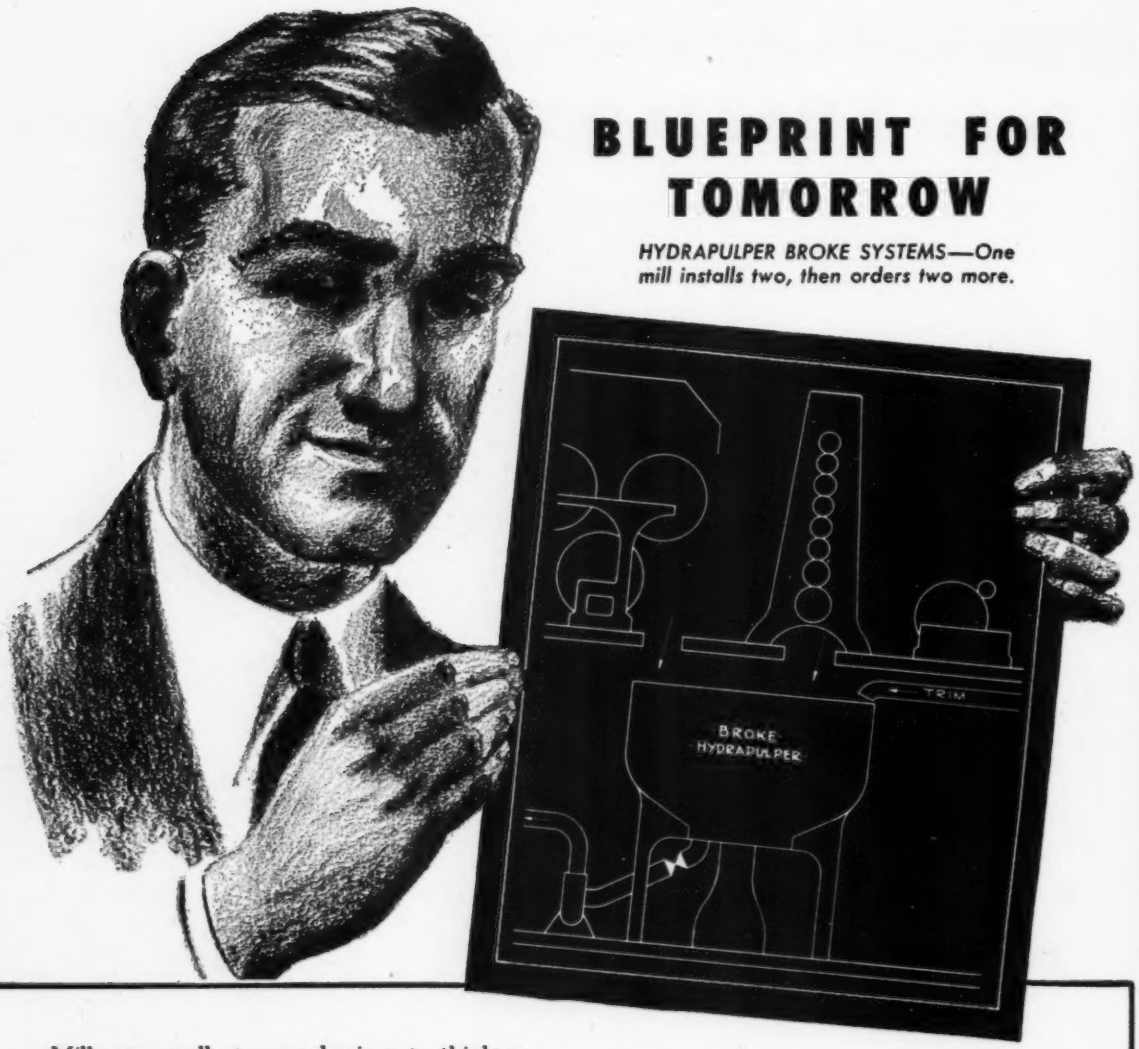
Because of its size and ability to operate in confined areas, the LT-35 makes it economically sound to provide mechanical handling on jobs where manual handling, with its excessive labor costs, was formerly the only available method. The small, agile LT-35 can save time, money and manpower on your operation by taking over countless handling tasks, accomplishing them in less time, with far less effort and at lower cost.

The new LT-35 is the smallest of the complete line of Towmotor Lift Trucks and Tractors, each a product of the experience and "know-how" that Towmotor has gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1220 East 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH
TOWMOTOR
THE ONE-MAN-GANG

12 ★ FEATURES

- ★ COMPACT
- ★ LOW STEP UP TO OPERATOR'S STATION
- ★ LIGHTWEIGHT
- ★ RUGGED CONSTRUCTION
- ★ MANEUVERABLE
- ★ 4-WHEEL STABILITY
- ★ AMPLE SPACE FOR OPERATOR
- ★ EASY REACH CONTROLS
- ★ HYDRAULIC LIFTING AND TILTING MECHANISMS
- ★ MAXIMUM ACCESSIBILITY FOR INSPECTION AND MAINTENANCE
- ★ SHORT TURNING RADIUS
- ★ ENGINEERED TO THE JOB BY TOWMOTOR



BLUEPRINT FOR TOMORROW

HYDRAPULPER BROKE SYSTEMS—One mill installs two, then orders two more.

Mills are usually too much given to thinking of the great performance of hydrapulpers in the fields of waste paper, dried pulps and various previously irreducible materials like wet strength papers—where they soon pay for themselves.

Hydrapulpers should likewise be considered for that more prosaic application—the disposal of broke; a service for which some progressive mills have already installed them.

Hydrapulpers, for broke disposal, are placed under dryers and calenders so broke can be continuously repulped without handling or confusion.

Operation is from the machine room floor and by the machine crew itself, without extra broke hands.

Used on broke, hydrapulpers save time and labor, reduce confusion when breaks occur, and also cut maintenance cost and reduce dirt.

Investigate the hydrapulper for the disintegration of virgin stocks, wet strength and ordinary waste papers; AND for use on machine broke.

Stock Preparation Systems
Hydrapulpers
Hydraliners
Hydracycle Tanks

Miami Jordans
Flex Couplings
X-66 Plugs
Bulldog Fillings
Selectifier Screens

Hi-Speed Beaters
Breaker Beaters
Propeller Agitators
Waste Paper Systems
Chests—all kinds

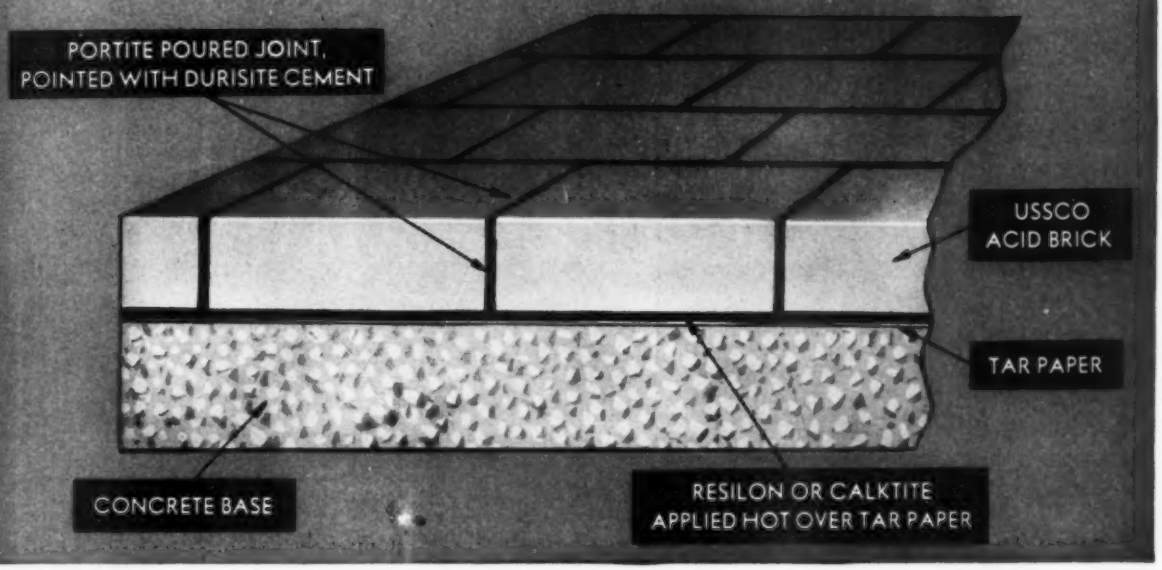
Waxing Machines
Water Finish Attachments
Valves—many types
Steamfits
Syphons

SHARTLE BROS. MACHINE CO.
MIDDLETOWN, OHIO

DILTS MACHINE WORKS, Fulton, New York
Divisions of THE BLACK-CLAWSON CO., Hamilton, Ohio
Associate: Alexander Fleck Limited, Ottawa, Can.

HOW TO BUILD A FLOOR *Resistant to*

STRONG and WEAK ALKALIES
STRONG and WEAK ACIDS . . .


PORTITE POURED JOINT, POINTED WITH DURISITE CEMENT
USSCO ACID BRICK
TAR PAPER
CONCRETE BASE
RESILON OR CALKTITE APPLIED HOT OVER TAR PAPER

WOULD YOU LIKE A COPY OF THIS 56 PAGE CORROSION-RESISTANT MASONRY CONSTRUCTION MANUAL?

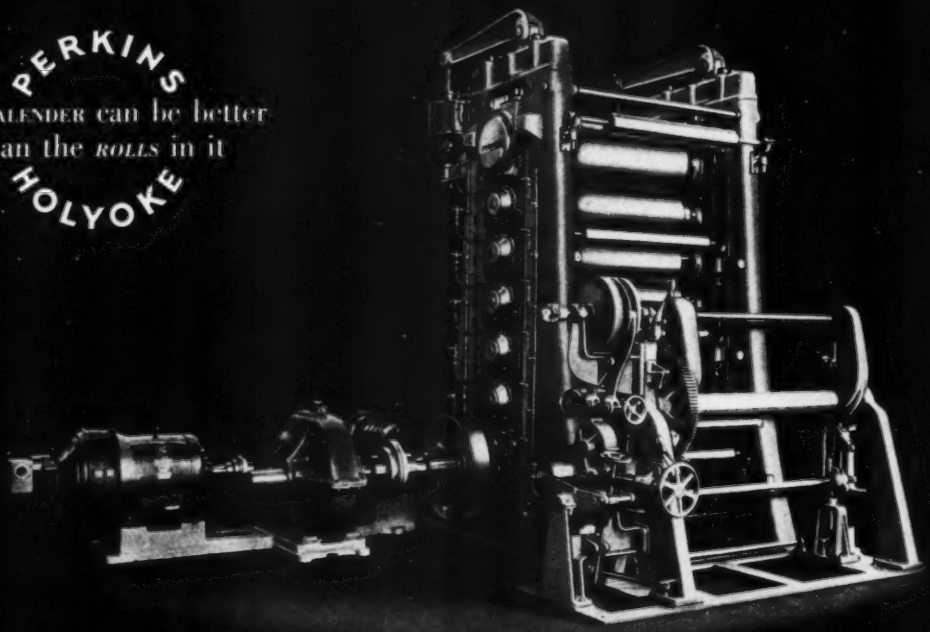
We'll be glad to send you, on request, a copy of this complete new technical manual, without cost or obligation. Ask for Bulletin 814.

THE floor sketched above will give long, trouble-free life under exposure to strong or weak alkalies and acids, solvents, steam, oils and grease, or alkalies and acids used alternately. U.S. Stoneware materials specified: Portite sulphur-base cement; Durisite resinous cement; Ussco Acid-brick; and Resilon or Calktite membrane, are available for immediate shipment. We'll be happy to provide design detail and engineering assistance where desired.

U. S. STONEWARE

Since 1865 • Akron, Ohio

PERKINS
No CALENDER can be better
than the *ROLLS* in it
HOLYOKE



PERKINS

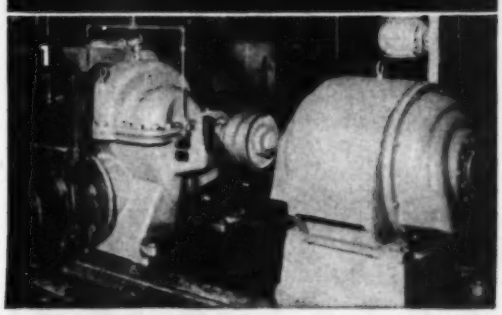
B. F. PERKINS & SON, Inc.
HOLYOKE, MASS., U.S.A.
LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

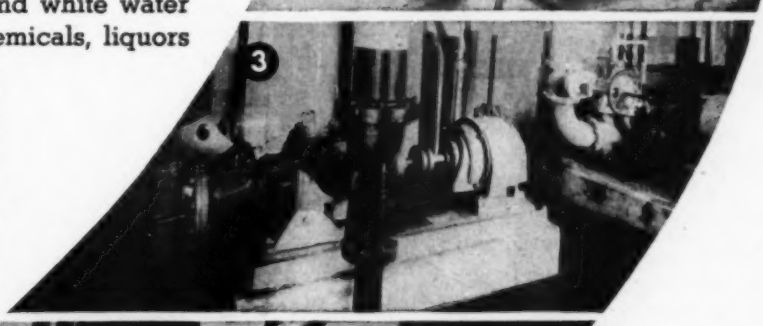
All-Purpose Pumping *means Goulds!*

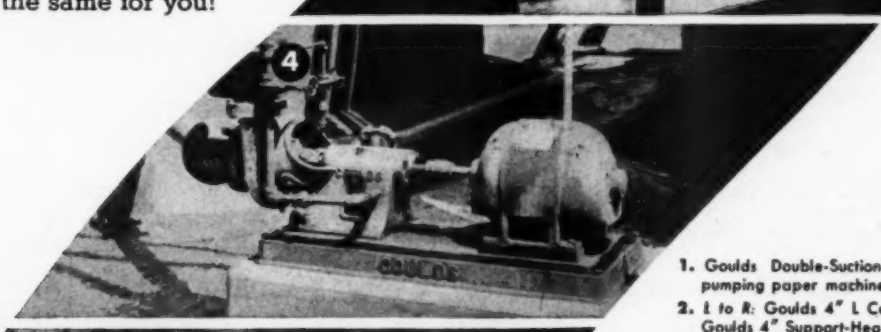
St. Marys Kraft Corp. utilizes over 30 Goulds Pumps for different purposes

JUST about every liquid transfer application encountered in a modern paper mill is handled economically by Goulds pumps. That's why so many mill operators call in Goulds engineers and say, "Tell me how many Goulds pumps I need to operate this mill efficiently!"

A case in point is the mill of St. Marys Kraft Corp., St. Marys, Ga. Here over 30 Goulds pumps are required for general water supply service, for pumping stock and white water of different consistencies, chemicals, liquors and sizes. Because Goulds makes such a complete line of paper stock pumps and pumps for general industrial service, the initial and operating costs on this installation appealed to St. Marys' buyers. Goulds can do the same for you!







1. Goulds Double-Suction Centrifugal is used for pumping paper machine white water at St. Marys.
2. *L to R:* Goulds 4" L Centrifugal Stock Pump; two Goulds 4" Support-Head black liquor centrifugals.
3. *L to R:* Goulds 4" L Centrifugal Stock Pump; Goulds 8" S, Double-Suction centrifugal for filtrate.
4. Goulds Support-Head Centrifugal for weak liquor.
5. Two Goulds 8" Double-Suction Centrifugals for fresh water.

Goulds PUMPS, INC.

FOR the JOB SENECA FALLS, N.Y.

What's Your Biggest Problem ?

There's no need to pause for your answer . . . it's the critical starch supply situation.

For 80 years we've lived with starch. Backed by our long experience with starch problems, through periods of both plentiful and scarce supply, we offer you counsel at a time when you need it most.

Our representatives know their stuff. They are plant-wise, thoroughly familiar with paper sizing, calendering, and coating materials, equipment and processes. They will be glad to go into a huddle with you.

So call on them for counsel.

80 YEARS OF SERVICE TO THE PAPER INDUSTRY

STEIN SH HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

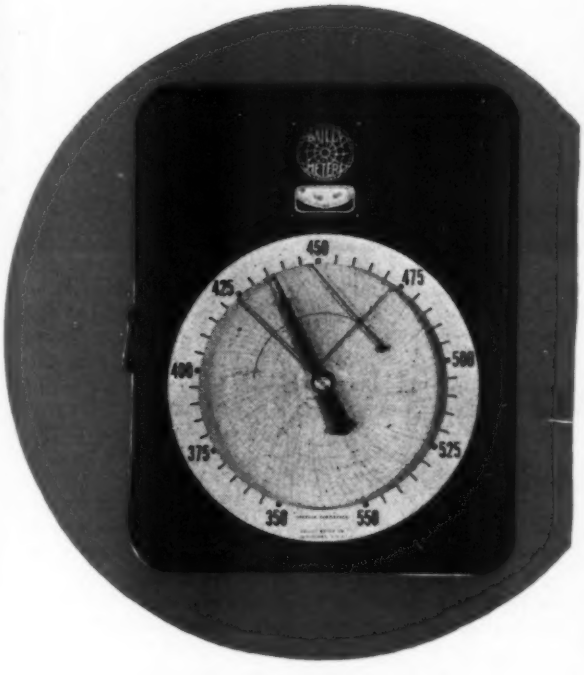
OFFICES IN PRINCIPAL UNITED STATES CITIES AND AT 250 VAN HORN STREET, TORONTO, CANADA

EST. 1906

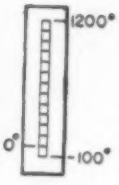
LABORATORIES AT NEW YORK, CHARLOTTE, N. C., PROVIDENCE, R. I., CHICAGO

FOUNDERS—STEIN-HALL RESEARCH FELLOWSHIP AT THE INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.

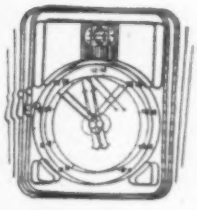
MEET THE BAILEY PYROTRON



A New Electronic Resistance Thermometer and Controller

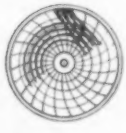


Indicates, records and controls temperatures between —100°F. and 1200°F.

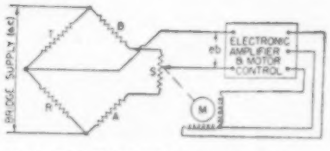


Resists vibration and shock.

Needs no careful leveling.



Makes as many as four continuous temperature records on one chart.

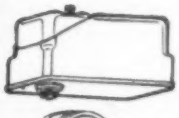


T = TEMPERATURE SENSITIVE PLATINUM RESISTANCE
A,B,R = FIXED RESISTORS M = SLIDEWIRE DRIVE MOTOR
S = SLIDEWIRE

Provides a complete measuring system for each temperature record—always connected and ready for immediate response.

Simple a-c measuring bridge needs no battery.

Sturdy inertia-free electronic unit which keeps the bridge in continuous balance replaces the usual Galvanometer and its attendant mechanism for step by step balancing.



Strikes new high in easy accessibility and interchangeability of electronic, electrical and mechanical parts. Replacement parts may be obtained as packaged units.

Offers choice of three controls—1. Air; 2. Electronic; 3. Electric, On-Off.

For details on this unusual electronic resistance thermometer, ask for Bulletin 230-A.

P-7

BAILEY METER COMPANY

1058 IVANHOE ROAD . . . CLEVELAND 10, OHIO

Controls for Processing

TEMPERATURE
PRESSURE
% OXYGEN
% COMBUSTIBLES
FLOW
LEVEL
DENSITY
RATIO

25 Ways to Save Money

with Ryertex Bearings

Lower lubrication costs, reduced power consumption, longer bearing life—these are some of the important savings developed through the use of tough, smooth Ryertex bearings.

Because Ryertex requires only water lubrication, oil and grease costs are eliminated. Its extremely low coefficient of friction means reduced power consumption in many paper-making bearing applications. And the great strength and hardness of Ryertex results in longer bearing life. Moderate initial cost is another money-saving Ryertex advantage.

Economical, efficient Ryertex has been proved by years of satisfactory performance in more than 25 different paper-making applications—from tiny 1″ bushings for rolls in Fourdriniers to giant forming boards more than 250″ long. We urge you to send data on your specific installations for quotation and complete information.

Joseph T. Ryerson & Son, Inc., Ryertex Div., Chicago, New York and Los Angeles.

Ryertex Applications Include Bearings for

Jordans	Grinders	Deckers
Refiners	Calenders	Jack Ladders
Beaters	Pumps	Drum Barkers
Press Rolls	Roll Stands	Conveyors
Screws	Washers	Log Hauls
Agitators	Knotters	Slitters, etc.

Also Suction Box Covers, Suction Pipe Covers, Forming Boards, Slice Boards and Doctor Blades.

RYERSON - RYERTEX

THE PAPER INDUSTRY
and PAPER WORLD

JULY, 1946

◆

You Need Job Evaluation

NORMAN PRATT
Job Evaluation Division
Labor Relations Institute

▸▸▸ JOB EVALUATION has outgrown its swaddling clothes and gone adult in a big way. Today this scientific method for developing a balanced wage structure has become as much a part of running a successful pulp and paper mill as good machinery maintenance. For one thing, job evaluation has enabled countless pulp and paper mills to line up their jobs in such a way that workers exercising the same skill, effort and responsibility can count on the same base pay. Secondly, through job evaluation the most serious source of turnover and grievances—w a g e inequities—has been toned down to a hush.

Less than fifteen years ago, however, the story was different. Then job evaluation ran into a strong chorus of "NO" from pulp and paper executives. Many in the industry felt—without investigating as fully as they should have—that installing this "new fangled contraption" was only for the elephant-size outfits which could hire fancy-fee engineers. As a result, job evaluation in the pulp and paper industry lagged behind the times.

The war changed all this. In the first place, the now extinct War Labor Board required an employer to have a clear-cut system for classifying jobs or be judged "not eligible" on wage increases or decreases. Under such legal restrictions it was evident that pay scales could no longer be set "by guess or by golly." They had to be sure fire accurate.

But War Labor Board regulations couldn't do much about runaway

13 Checks on Job Evaluation for Pulp and Paper Mills

Job evaluation must be tailor-made to *your* mill. Don't try to keep more creases in your pocketbook by working out your own "homemade" plan.

On the question of how soon to put it in, don't "rush in where angels fear to tread." Give job evaluation your serious thought in terms of what you want it to do. If there's been any recent labor trouble, allow at least a month for the tempest to die down.

But once you decide job evaluation is for you, don't expect it to clean up all your labor problems. It's an excellent technical tool, but not a substitute for efficient management.

Every employer first thinks that job evaluation will show overnight results. Not so. It takes at least six months to get results because it's planned on a long-range basis.

Very bad labor relations is to "spring" job evaluation on workers. It needs a well-planned "selling program" to put it over among workers. And don't sell the moon in ribbons. Everybody WON'T get a raise.

And be sure to leave the way open for settlement of individual complaints *after* job evaluation has been installed.

Look for intangibles to register some important long-range savings. If you look for tangibles alone, you'll miss those important savings in worker morale and decreased labor turnover.

Until you're ready to have every job and operation in your organization classified and overhauled, don't think you have job evaluation. Halfway measures are worse than none.

As for time required to get job evaluation set up, don't rush the engineer. He needs time or else some serious errors will result. A few jobs evaluated each day is a full day's work.

Trial rates should not be set for new jobs. A sound job evaluation needs no trial period and new jobs just fall into line automatically.

In setting up an employee committee, don't give it veto power over the engineer's detailed findings. Limit its authority to advice-giving.

On period re-examination, don't tamper with job evaluation without calling in the expert. It's a permanent fixture once installed, and you may do it untold damage.

No! You don't have to be a giant in your field to make job evaluation pay off. Smaller pulp and paper mills have proved that wide benefits can accrue to them.

rates. In all industries, including the paper and pulp business, there just weren't enough workers to man the jobs and employers were forced to outbid each other in the scramble for labor. The result is that today acid makers, beatermen, chip-bin men, paper cuttermen, and other job classifications are getting going wage rates out of proportion to the relative skills and experience of workers performing the jobs. Nor is the paper and pulp industry unique in this. Uncomfortable bedfellows are squirming in practically every branch of industry.

Hence the swing of the pendulum towards job evaluation in all types of trades and services.

Thus, in a recent survey taken by the Research Division of the Labor Relations Institute, queries from paper and pulp executives about job evaluation went up 33.3 per cent over all *other periods taken together!* But even more important, only one-fourth of these executives wanting to know more about job evaluation could be construed as "giants" in their field.

The queries showed another thing—pulp and paper management, though willing to give job evaluation a try, still is lost in the tunnel midway between daylight and darkness on what job evaluation sets out to do and how it is put to work.

While job evaluation renders many long-run advantages in terms of those hard-to-pin-down "intangibles," here are some of the more concrete dollars-and-cents advantages:

Cuts labor turnover: A cardinal labor relations principle for all industry postulates that more workers quit their jobs because they are not satisfied with wage rates than for any other single reason. And nowhere is this more true than in the business of supplying a nation of readers with paper. This industry has long been hounded by wide discrepancies in going wage rates for key jobs. To any interviewer who has talked to log-haul operators and lime slakers in exit interviews, the complaint, "Why should I do the same work as Jones when he gets more money?" strikes a familiar ring.

Lifts below-standard wages: Determining the specific requirements of each job will fit the right man to the right job—and will permit paper mills to boost some wages not in line with others while *not increasing unit labor costs.*

Lowers unit costs: Once a job evaluation gets going in any business, unit labor costs, it has been conclusively shown, gradually dip.

Picks up worker incentive: Put in a job evaluation and let the worker know exactly how each job is rated, and he'll develop initiative to qualify for those much-coveted, higher-rated positions.

Sets rates for new jobs: Perhaps new jobs don't pop up in the paper industry as often as in the plastics field—but when they do, job evaluation will have laid the groundwork for them to fall into line automatically.

Raises employee morale: Job evaluation gets right to the crux of employee dissatisfaction by reducing charges of "company favoritism" to a minimum. Workers doing tasks of the same relative skill, effort, and responsibility will be paid the same base rates.

Takes guesswork out of labor costs: Paper mills particularly have been plagued by the inability to forecast labor costs due to wide discrepancies in the wage structure. Job evaluation will bring about a nearer-to-accuracy advance prediction of what labor costs will add up to year in and year out.

Distributes wage cuts uniformly: To workers a wage cut is anathema. But should this become necessary under job evaluation, wage cuts will be put through proportionately, allowing a minimum of "humanics" and concentrating instead on "scientifics."

Picks up supervision: Because job evaluation cuts down the central source of employee grievances, the supervisory staff is given more time to manage and is not forced to devote precious minutes trying to iron out a perpetual load of "beefs."

Once you've decided that a job evaluation is pulp for your mill, it's bad policy to call in the specialist and tell him to put one in before you've laid the groundwork with the employees. Engineering alone doesn't do the trick. It must be mixed with "human relations." And right here the paper mill executive is faced with a dilly dilemma. What about the union? This is particularly significant in view of the latest Labor Relations Institute analysis of trade-union trends. For although the AFL through two well-established and well-functioning organizations has been up to now the sole bargaining agent of organized pulp and paper mill workers, the CIO is girding behind-the-scenes for some intensive organizing overtures in this same direction. It thus behooves every executive in this industry to be alert to future union complications in contemplating any job evaluation.

Will the union play ball? The blunt answer is "yes,"—if handled correctly. Although unions in the past have been generally opposed to job evaluation, they have nevertheless *not* been the major stumbling blocks to the proper installation of balanced wage structures.

In fact, during the war, unions proved themselves the loudest tub-thumpers for scientifically-set pay scales because under such set-ups the WLB permitted increases—small ones, to be sure, but increases nonetheless.

While unions with jurisdiction over the pulp and paper mill workers will generally agree in principle to job evaluation, the real problem comes up when the union agrees to go along only on its own terms.

Here management must use all the collective bargaining know-how at its disposal. Generally, the union will demand that job evaluation shall be a joint union-management undertaking. Close to 10 per cent of the work done by Institute engineers is "pulling the acorns out of the fire" after employers have conceded to this point.

The proper management stand on this should be that job evaluation is a rate-setting procedure and therefore a management prerogative exclusively. In order that this prerogative be carried out effectively, the employer should select the engineers to supervise the procedure and stand the expense of installation without getting snarled up in constant bickering.

But the best safeguard against arousing the suspicion and resentment of union and employees toward job evaluation is to convince them that the evaluation will be above all objective and fair. Point out that, although some jobs may be downgraded, the long run picture will reflect higher over-all wages and more security for the worker.

And as a further evidence of good faith, the employer should be sure to explain that any worker complaint over the results of evaluation would be later considered as a grievance to be handled through the regular grievance machinery.

Most practical way of assuring worker co-operation and understanding of job evaluation is to establish a worker's committee. This goes for union and non-union plants. In selecting such a worker's committee, management would be wise to suggest that the more experienced employees who have been with the firm for a reasonable period of employment should make up the committee. These would be more familiar with policies and operations and would appreciate the problems involved.

Primary object of this committee would be to meet with the engineer and management, check the findings on each job, and either approve them *in toto* or suggest changes in terms of special worker understanding of what the jobs demand. The committee should not be given the veto power over the engineer's evaluation.

A job evaluation should be tailor-made. It is well to give good warning at this point. One mill owner got this far along in his thinking and decided to put in his own job evaluation by taking the best features of several plans installed in other mills. Too late he discovered his error when workers laid a buzzing hornet's nest of complaints, charges and counter-charges on his doorstep. On this point, too much needless work has been done by engineers of the Labor Relations Institute in extricating companies from homemade job evaluation attempts.

While it is true that job evaluation methods have been more or less standardized up to a close approximation, there is no over-all plan that can be adopted in two shakes by every paper mill in existence.

Caution Number One: Remember that *job evaluation must be log-hauled to fit* your mill, not the reverse.

Caution Number Two: Halfway measures are worse than none. In any job evaluation, each job and operation must be scrutinized, checked and double-checked *individually*, and separate findings must be dovetailed for the whole organization by the expert. Booklets on ten easy ways to put job evaluation to work for you can do no more than indicate certain generalities. But it is well for management to acquaint itself with basic pointers on how job evaluation will knock out the uneven spots in your wage structure.

Job evaluation defined is nothing more or less than a precise description of job requirements. It sets a value on each and every job in the mill, from bark skinner and yardman to pump inspector and foreman. It works on the well-tested theory of "rate the job alone—rule out the worker." Obviously, some jobs are worth more than others to an employer in terms of skill, experience, physical and mental effort, responsibility and other factors known to the specialist whose business it is.

At all times, the employee is paid according to what he does in any given mill, not on what he knows from another mill. For example, a foreman's job can differ widely from paper mill to paper mill. One job may require considerable on-the-spot responsibility for operations, while another may be merely routine. It is obvious that the first job should be rated considerably higher than the second. Factors such as this are what is meant by having a job evaluation cut to order for a specific paper mill.

In his work, the engineer looks into the *What, Why* and *How* of each job. He wants to know these things:

WHAT the job requires the worker to do:

(a) What tasks make up the job?

(b) How often are these tasks performed by the worker on the job?

(c) Are all these tasks performed by every employee designated by the same job title?

(d) What is the relative difficulty of each task as compared with the others required to get the job done?

HOW the worker has to perform these tasks to do the job efficiently:

(a) What tools, materials and equipment are used to accomplish all the tasks required on the job?

(b) What precise methods or process are used to accomplish the task?

WHY the worker has to perform each task to get the job done:

(a) Why is the job done and what is its overall purpose?

(b) Why is each task performed and what is its purpose in each individual case?

(c) What is relationship of each task to other tasks and to the total job?

To find out these key facts, the engineer uses what's known as job description. This is broken down into ten specific steps and is usually routine for all paper mill operations:

Step 1—Brief description of the nature of the work performed

Step 2—Detailed description of actual equipment used

Step 3—Statement of hazards involved in performing the job, to the operator as well as to other workers

Step 4—Discussion of supervisory functions, if any. Direct or indirect supervision clearly distinguished

Step 5—Description of the value of material handled or processed.

Step 6—Mention of possible damage that may occur to either the material or equipment used

Step 7—Description and evaluation of skill and dexterity required to accomplish the job efficiently

Step 8—Follow-up on accuracy required for good performance

Step 9—Inclusion of any expense which the operator may incur personally in accomplishing his job

Step 10—Detailed account of the mental and physical effort demanded by the job

Job evaluation engineers have perfected a handy yardstick by which to analyze all key jobs after these have undergone job description. This breaks down jobs into four common characteristics as follows: *Skill, Effort, Responsibility, and Job Conditions.* These go through their minute breakdown and further evaluation and finally your firm is ready for a translation of all these findings into hard-and-fast wage rates.

Up to this point in the procedure, engineers' methods used are more or less systematized. But when it comes to this *most important part of job evaluation,* engineers differ on their plans, depending upon their experience and their judgment in terms of a specific mill. There are two distinct types of evaluation plans—the non-quantitative and the quantitative. Both of these have their scholarly adherents and books have been filled for the college student's homework on the relative merits and demerits of each.

Boiled down and stripped of the "if's" and "but's," engineers with long experience in the paper manufacturing industry have formed a consensus of opinion in favor of the quantitative evaluation system because it allows a higher degree of accuracy through a novel system of *points.* The four basic job fundamentals—skill, effort, responsibility and job conditions—are thus subdivided into their many branches and assigned points. This procedure is far from a cut-and-dried affair, but will vary depending upon the engineer's experience and special conditions. One paper mill may be given a point scale of 1-500 for skill, where another may be given only 200. This type of calculation is highly technical and for practical purposes no employer need decipher the codework.

Once the point structure has been set up, the rest of the work is completed in short order. The engineer graphs up a "scatter chart," which shows the newly-evaluated wage rates and the current rates in practice before the job evaluation. This system immediately turns up the rates out of line, whether they be too high or too low. And your job evaluation is now complete.

A last word of warning: A job evaluation is far from a master-mind robot that runs on and on, without periodic examination or close scrutiny of results from time to time. One mill owner, assured that the new system was a permanent fixture, promptly threw in a new job that arose on the scatter chart of evaluated jobs. In no time at all, this little Frankenstein grew into a monster to hound his sleep *because his one small arbitrary act threw the entire system out of kilter.* It is true that an occasional checkup is in order,—but the expert who installed the job evaluation should be called in.

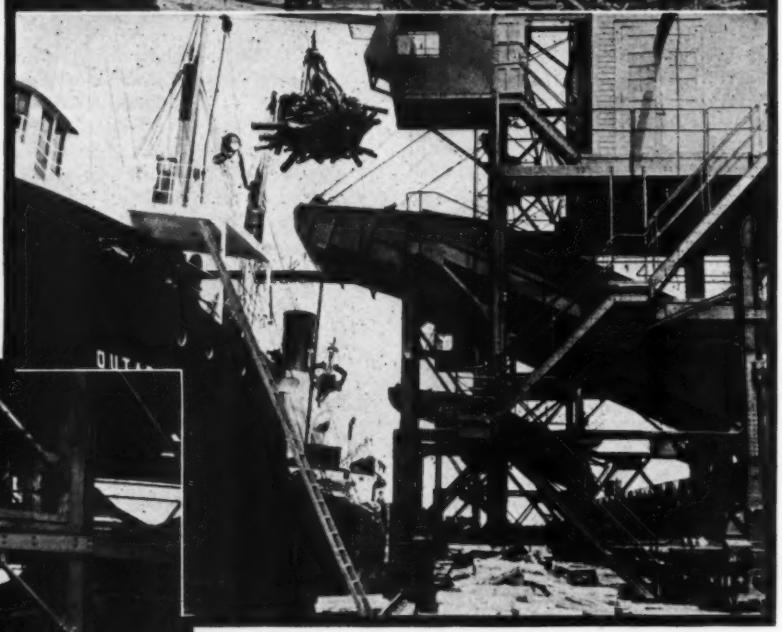
In short, a job evaluation will become an effective part of running a successful paper mill only if it is treated as a management technique. And like any technique it must be developed and cared for over a period of time if it is to continue to render efficient service.

Pulpwood Volume Measured By Water Displacement

▶▶▶ PULPWOOD RECEIVED by the Ontario Paper Co., Ltd., Thorold, Ontario, is measured for volume by displacement of water. To make use of this method of measurement, the mill utilizes two measuring tanks, two steel cages (one for each tank), and a system of mechanical handling equipment for delivering the wood to the tanks and for transporting it from them.

The pulpwood, all in four-foot lengths, is delivered to the mill by boat. In the unloading operation, a pulpwood grapple (grapple made by The Owen Bucket Company, Cleveland, Ohio) transfers the wood to a conveyor, which, in turn, discharges it into one of the two steel cages. When the cage is full, it is submerged in the water in its respective tank. The level of the water is thereby raised.

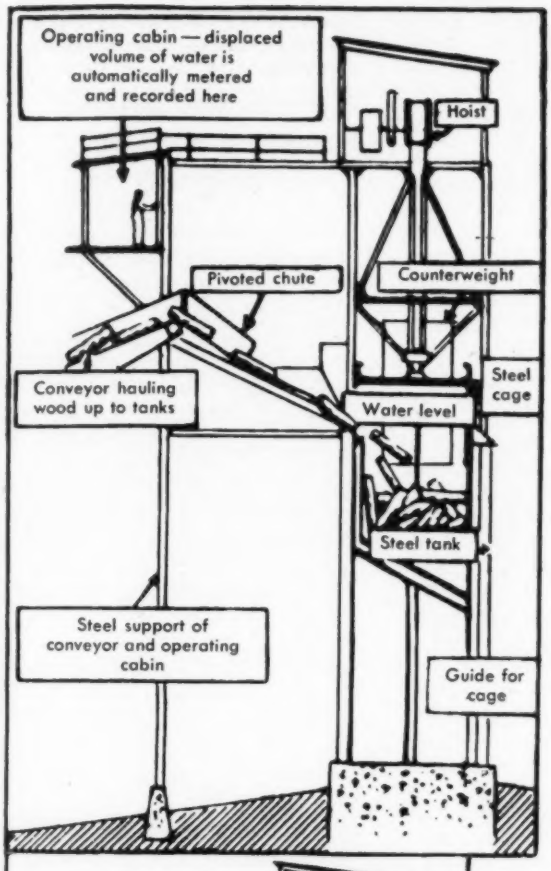
The difference in this level and that before charging with the loaded cage (determined to within a fraction of an inch) multiplied by the known area of the water's surface is the volume of the wood plus that of the cage. Subtracting the known volume of the cage from this total gives the volume of the wood.

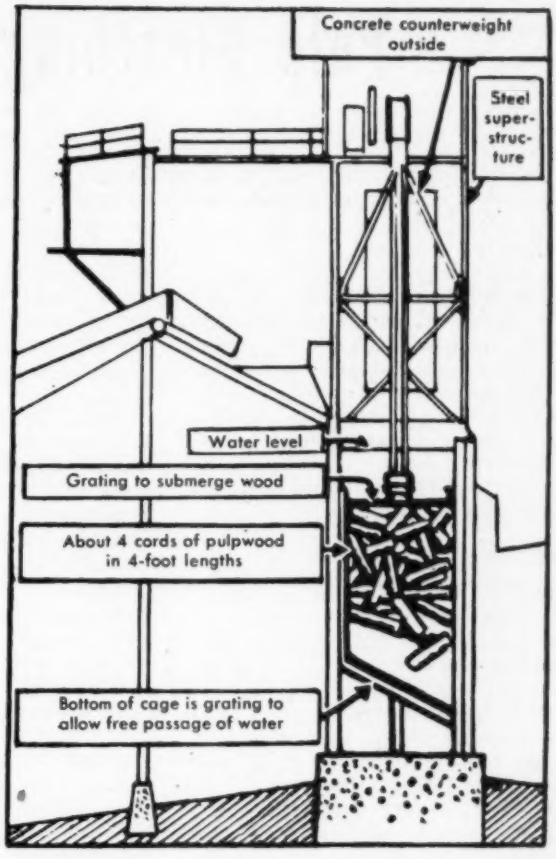


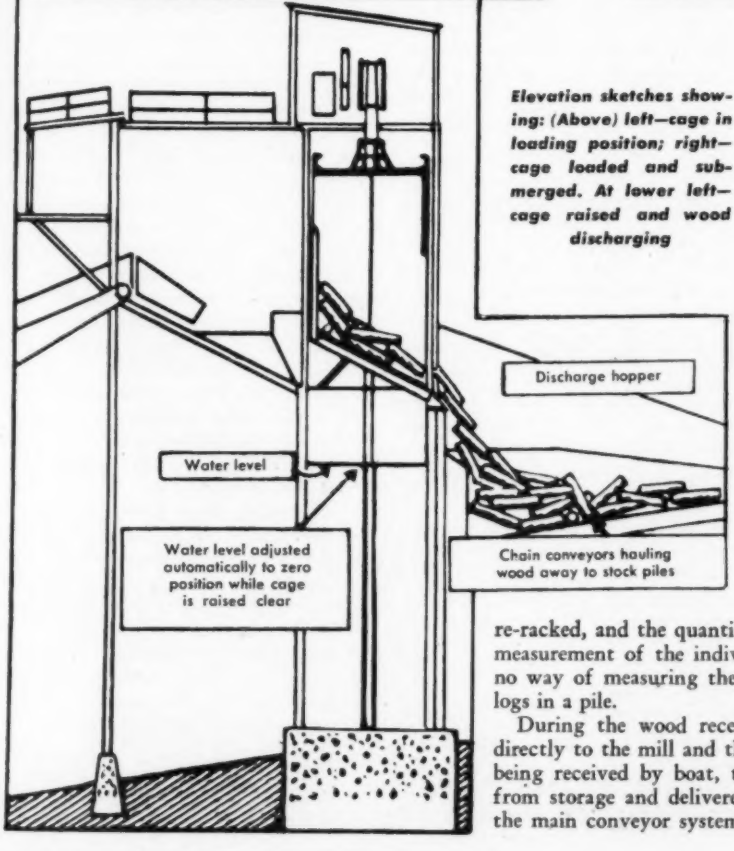
Above (first)—General view of pulpwood receiving dock

Above (second)—Pulpwood enroute to volume measurement water tanks

Left—Receiving conveyor for pulpwood from volume measurement water tanks




Concrete counterweight outside
Steel superstructure
Water level
Grating to submerge wood
About 4 cords of pulpwood in 4-foot lengths
Bottom of cage is grating to allow free passage of water


Discharge hopper
Water level
Water level adjusted automatically to zero position while cage is raised clear
Chain conveyors hauling wood away to stock piles

Elevation sketches showing: (Above) left—cage in loading position; right—cage loaded and submerged. At lower left—cage raised and wood discharging

Each cage weighs 11 tons and holds between three and one-half and four cords of wood. The wood by itself weighs more than 8½ tons so that nearly 20 tons are submerged at one time.

With the two cages working alternately, each upon a five minute cycle for loading, immersing, reading of tank level, raising and dumping to discharge conveyor, more than 80 cords of wood can be handled to a fine degree of accuracy in an hour.

Before this method of wood measurement was put into operation, all of the wood was racked on the ships and the total approximate quantity obtained from the number of racks. A sling chain was tied around the wood of each rack; and, in this fashion, one sling load at a time, the wood was removed from a ship through the use of a crane. To check the accuracy of racking, a number of random cords were dumped on the dock, carefully re-racked, and the quantity of wood in these racks obtained by actual measurement of the individual logs. This method, however, included no way of measuring the volume occupied by air spaces between the logs in a pile.

During the wood receiving season, part of the wood is delivered directly to the mill and the balance goes to storage. When no wood is being received by boat, the pulpwood for mill operation is grappled from storage and delivered to a small portable conveyor which feeds the main conveyor system for transfer to the wood room.

Pulp Bleaching*

L. E. RUSSELL
The Mathieson Alkali Works (Inc.)

▶▶▶ THE CELLULOSE produced by commercial pulping processes contains incrustants, such as lignin, pectin, carbohydrates, and coloring matter, which were either present originally or formed during pulping. Bleaching processes are designed to remove these incrustants and to produce a pulp of increased brightness by solubilizing or oxidizing colored impurities.

Development of Bleaching Methods

After chlorine was isolated by Scheele in 1774, Berthollet prepared a bleaching solution, in 1785, by reacting chlorine with a solution of potassium carbonate. A bleach liquor, prepared by passing chlorine gas into caustic soda or milk of lime, was patented by Charles Tennant in 1798. It was Sir Humphrey Davy, however, who is credited with the first commercial utilization of chlorine as a bleaching agent when he used it on Scotch linen goods.

Bleaching powder was used in the pulp and paper industry until about 1920. Since then, there have followed a number of developments; the use of liquid chlorine in single-stage hypochlorite bleaching, multistage bleaching, including the use of caustic soda extraction, sulphur dioxide antichlor, sodium peroxide, sodium chlorite, and chlorine dioxide.

Bleaching Terminology

Before the reactions and kinetics of bleaching processes are discussed, it may be desirable to define pulp bleaching terminology which is, in many instances, similar to that used in other phases of pulp and paper technology.

Hard stock versus *soft* stock applies to bleached as well as unbleached pulp. There is some difference of opinion among pulp and paper men concerning these terms, but originally they were used to define the degree of purification of the pulp. Thus, a soft stock was one which was more highly purified and had a higher cellulosic content than a hard stock. At the present time, however, the emphasis is on the resulting characteristics of the pulp, rather than on its purity. Thus, a hard stock now usually connotes a pulp which develops higher strength and hydrates rapidly.

Consistency refers to the percentage of pulp in the water suspension, and is usually spoken of in terms of *air dry* pulp, the moisture content of which is arbitrarily set at 10 per cent. Many pulp laboratories prefer to calculate consistency on the basis of *bone dry* pulp, thus indicating the true percentage of pulp in the water suspension.

Brightness is the reflectance of the pulp as measured by a photo electric cell at a specified wave length, compared to the reflectance from a block of magnesium oxide at the same wave length.

Available chlorine refers to the oxidizing capacity of a compound and may be measured by the amount of iodine which the compound can release when reacted with an iodide. Thus, 100 per cent available chlorine is represented by molecular chlorine with a weight of 71, which gains two electrons or liberates one molecule of iodine when reacted with potassium iodide:

$$Cl_2 \xrightarrow{-2e} Cl+$$

$$2I^- \xrightarrow{-2e} I_2$$

The change from chlorine dioxide to chloride ion involves five electrons. Since the molecular weight of chlorine dioxide is 67.5, the per cent available chlorine in this compound is calculated as follows:

$$\frac{\frac{5}{2} \times 100}{67.5} = \text{equals about 265 percent available chlorine}$$
$$\overline{71}$$

Residual chlorine is the amount of available chlorine remaining in the stock at the end of the bleach, just prior to washing. It is usually expressed in per cent on the weight of the stock, rather than on the solution basis.

(*) From a paper presented at Brooklyn Polytechnic Institute on January 10, 1946, before Dr. Robert Aries' class in Pulp and Paper Technology.

BLEACHING METHODS

Hypochlorite Bleaching

The Chlorine Water System

Chlorine in water undergoes the following reversible hydrolysis:

$$Cl_2 + H_2O \rightleftarrows H^+ + Cl + HOCl$$

The hydrolysis constant varies from 7.45×10^{-4} at O deg. C., to 9.75×10^{-4} at 60 deg. C. It can be seen, therefore that an increase in the temperature of the system results in a shift of the equilibrium to the right with an increase in hypochlorous acid, hydrogen, and chloride ions, at the expense of molecular chlorine.

Hypochlorous acid dissociates as follows:

$$HOCl \rightleftarrows H^+ + OCl^-$$

The equilibrium constant in this reaction is 3.7×10^{-8} at 18—20 deg. C.

The *p*H of the chlorine water system is a very important factor in chlorine bleaching processes, since it influences the proportions of hypochlorous acid, hypochlorite ion, and chlorine in the solution.

Chemistry of the Chlorination (or Acid) Stage of Hypochlorite Bleaching

In the chlorination stage there occur three different reactions: substitution, addition and oxidation. In *substitution*, a chlorine atom replaces a hydrogen atom in the noncellulosic material, and this hydrogen atom combines with another chlorine atom to form hydrochloric acid. When there is direct *addition* of chlorine to noncellulosic materials, no hydrochloric acid is formed. When *oxidation* occurs, the reaction utilizes the hypochlorous acid formed from the hydrolysis of chlorine as shown in the equation above. In this case, all the chlorine forms hydrochloric acid. It is evident, therefore, that the highest efficiency based on chlorine would be from addition reactions, followed by substitution and oxidation reactions.

The chlorination of lignin is very closely related to the demethylation of lignin. It has been shown that lignin contains a phenolic or enolic hydoxyl group which is very readily methylated. The demethylation of this part of the lignin molecule, followed by oxidation, is the rapid primary reaction when lignin is chlorinated.

Kinetics of the Chlorination Stage of Hypochlorite Bleaching

According to work done by Hisey and Koons (*1*) the hydrolysis of chlor-

ine is suppressed by increasing chlorine concentrations (and hence increasing acidity) to such an extent that there is practically no hypochlorous acid when the *pH* falls below 2. At a *p*H of about 5.5 there is 100 per cent hypochlorous acid, and above *p*H 9 the hypochlorite ion predominates.

Loeschbrandt (2) has similarly pointed out that the velocity of the primary, or solubilizing, reaction is increased as *p*H is decreased. Further oxidation, which should naturally be maintained at a minimum because it results in lower chlorine efficiency, appears to be fairly independent of *p*H. Therefore, the controlling factor with reference to further oxidation is the velocity of the primary reaction. This relationship of the relative velocity of further oxidation is expressed as equal to:

$$\frac{\text{Velocity of Further Oxidation}}{\text{Velocity of Primary Reaction}} \times \frac{K}{Kph}$$

where K is approximately constant and Kph increases with decreasing pH. From this equation, it is evident that the decreasing pH produced by an increased chlorine concentration reduces the value of $\frac{K}{Kph}$ and hence the relative velocity of further oxidation, thus increasing the efficiency of the reaction.

The quantity of chlorine required in chlorination naturally depends upon the amount of materials to be solubilized. In general, the greater the amount of chlorine consumed in the chlorination stage, the whiter the final pulp will be. The addition of an excess of chlorine is of doubtful value, however, because wasteful secondary oxidation reactions occur. For greater efficiency, therefore, it is desirable to maintain conditions which will give a maximum of primary reactions with a minimum of side reactions.

The consumption of chlorine is in practically linear relationship with temperature changes, consumption per unit time being increased at increasing temperatures. Increasing time will also permit increasing quantities of chlorine to be consumed, but this factor is obviously limited.

Washing After the Chlorination Stage

A high washing efficiency after the chlorination stage is essential in order to effect a thorough removal of acid-soluble material. If the pulp is first neutralized with alkali, efficient washing is important for the removal of alkali-soluble materials.

At this point it may be well to discuss the relative merits of neutralization versus acid wash in the chlorination stage. It has been suggested that alkali be added at the end of the chlorination stage, converting the remaining chlorine to hypochlorite. There are two disadvantages to this procedure, however. First, it results in high consumption of alkali to neutralize acid that might otherwise be washed out. Also, in view of the fact that the secondary oxidation reaction velocity is not changed, but is relatively displaced, by the maintenance of an acid mixture, the use of a neutralizing procedure would not appear to be particularly effective.

Alkaline Hypochlorite Bleaching

The importance of regulating the *p*H in alkaline hypochlorite bleaching may be seen from the following:

a) As the *p*H is decreased, the degradation of cellulose increases, rising to a maximum near the neutral point.

b) The rate of self-decomposition of a chlorine solution is greater as the *p*H approaches neutrality from the alkaline side.

c) These points in favor of a high *p*H are counteracted by the fact that as the *p*H rises, the concentration of hypochlorite ion is decreased in favor of hypochlorous acid, so that the bleaching process becomes slower. As a result, a compromise must be made. This compromise is set at a *p*H range of 8 to 9. As acidic substances are formed during the bleaching process, it is necessary to add sufficient alkali to maintain the *p*H within this range.

Increase in concentration increases the rate of consumption of bleach, saves steam, and tends to increase brightness up to the point where the factors of *p*H and good mixing are adversely affected. Increase in temperature increases reaction rate, decomposition rate, and amount of degradation. It is generally considered that maximum temperature in hypochlorite bleaching should be 35 deg. to 40 deg. C.

Caustic Extraction

The use of a caustic extraction stage or stages has as its primary purpose the removal of the lignin and coloring matter solubilized during pretreatment. If these products are not removed from the fibers at this point, later stages will require excessive amounts of oxidizing agents.

It has been found by a number of investigators that sodium hydroxide is the most effective alkali for caustic extraction, ammonium hydroxide, soda ash and sodium metasilicate are intermediate, and calcium hydroxide is least effective. The ineffectiveness of calcium hydroxide is due to the formation of calcium lignin compounds that are highly colored and difficult to bleach.

Increased alkalinity increases the effectiveness of extraction. Alkali concentration must be limited, however, to prevent removal of hemicelluloses, a break in the alkali-sensitive linkages, and purification of the cellulose beyond the point desirable for paper-making grades of pulp. For the production of high-alpha pulps, higher alkalinities are required.

Extraction time in excess of 30 minutes is of little value, according to Loeschbrandt. Up to this point, an increase in solubilized material is obtained with increased time.

Increased temperature gives increased efficiency of extraction, with purification taking place at about 70 deg. C. and over. Details regarding temperature and concentrations for particular pulps will be considered later.

As regards consistency, it can be generally stated that the higher the consistency, the better the results obtained. This is due to the fact that the benefit resulting from the increased alkali concentration which goes with higher consistency outweighs in importance the disadvantages of decreased solubility of the reaction products and decreased rate of diffusion.

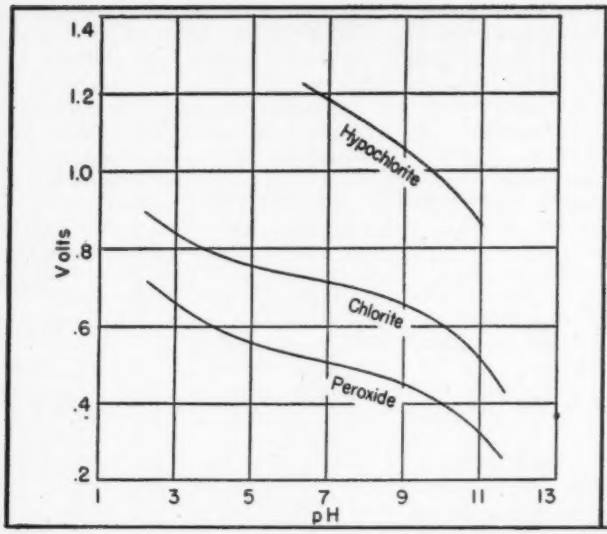
Peroxide Bleaching

The use of peroxide as a bleaching agent for pulp has been reported in the literature for many years, but it was not extensively applied until the late thirties, when the industry started bleaching mechanical pulp. In this process the peroxide oxidizes some of the coloring matter in groundwood, increasing the brightness without any appreciable loss in yield. To provide a buffered alkaline condition and to protect the peroxide from catalytic decomposition, sodium silicate is usually used in conjunction with the peroxide.

With an increase in consistency of the pulp, the bleaching time is decreased and a higher brightness is obtained. Increase in temperature also decreases bleaching time and improves whiteness, while causing very little, if any, physical damage to the pulp.

Sodium Chlorite and Chlorine Dioxide Bleaching

Sodium chlorite, and chlorine dioxide which is produced from it, are coming into greater use in the bleaching of pulp. Hypochlorite bleaching causes increased degradation of the cellulose as the ratio of cellulose to



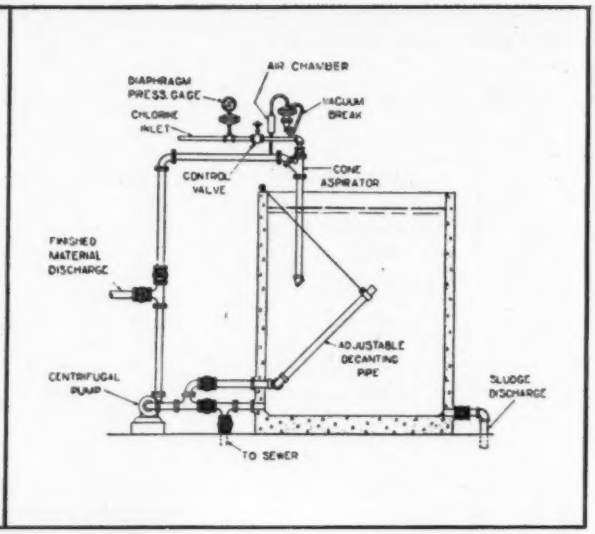


Fig. 1 (left)—Oxidation potentials of bleaching agents referred to the normal hydrogen electrode. . . . Fig. 2 (right)—General arrangement for manufacture of calcium hypochlorite

noncellulosic material increases, that is, as the bleaching progresses. Sodium chlorite and chlorine dioxide, on the other hand, selectively oxidize the coloring matter and solubilize any remaining lignin compounds without affecting the cellulose.

When employed for bleaching, sodium chlorite is used together with, or "activated" by, acid, hypochlorite, or chlorine.

In the *acid activation* process *p*H is of utmost importance. A decrease in *p*H increases the rate of reaction until a limit is reached around *p*H 3.5. At this point there is a loss of efficiency due to the evolution of chlorine dioxide; difficulties may result also because of a lack of corrosion-resistant materials.

In the *chlorine activation* process, the chemistry of the reaction is as follows:

$$2NaClO_2 + Cl_2 \rightarrow 2ClO_2 + 2NaCl$$

Here the available chlorine (both as sodium chlorite and as chlorine) is utilized in the pulp as chlorine dioxide. A *p*H of about 6.0 appears to be optimum for this pulp bleaching process.

In the *hypochlorite activation* process, four parts of available chlorine as sodium chlorite react with one part of available chlorine as hypochlorite to form chlorine dioxide. However, experience has shown that it is desirable to have an excess of hypochlorite, the optimum ratio of hypochlorite to chlorite on an available chlorine basis being in the range 1:1 to 3:1. This process should be carried out in a *p*H range of 8.5 to 9.5. However, in the event that the *p*H is not closely controlled, the chlorite provides protection against the effect of acid hypochlorite, since with decreasing *p*H it reacts more rapidly with the hypochlorite to form chlorine dioxide.

Increases in concentration, time and temperature increase reaction efficiency. In the case of chlorine activation and hypochlorite activation, however, it is advisable to observe a temperature limitation of about 40 deg. C.

The reason for the fact that sodium chlorite does not degrade cellulose has been discussed by various authors, including White, Taylor and Vincent (*3*); Jeans and Isbell (*4*). Work with sugars has demonstrated that chlorite will not break carbon-carbon linkages, whereas hypochlorite will. Figure 1 shows the oxidation potential of chlorine, chlorite and peroxide over the *p*H range normally encountered in bleaching. The lower oxidation potential of chlorite is largely responsible for the lack of cellulose degradation,

APPLICATIONS OF BLEACHING PROCESSES TO VARIOUS PULPS

Relation Between Bleaching And Pulping Processes

The bleaching processes discussed can be applied to a wide variety of woods, to produce pulps with many different characteristics. It is important to understand, however, that there is a close interdependence between the pulping process and the bleaching process used, and that both must be considered in order to produce a finished product with the required characteristics. Thus, the production of a hard stock, soft stock, dissolving pulp, semibleached, or full bleached pulp from such different woods as northern spruce, jack pine, southern pine, white hemlock, beech, birch, maple, and hard woods, and from other fibers, such as flax, hemp and straw, requires the selection of the proper bleaching process. But, before bleaching, it is first necessary to choose the proper pulping conditions to produce a material which will respond in the desired way to the bleaching process.

In order to produce the pulp economically, moreover, it is necessary to proportion the amount of purification to take place in each of the processes (that is, the pulping process and the bleaching process) so that the over-all cost of the product will be at a minimum.

Groundwood

In groundwood, practically all of the original wood substance is present with the exception of a few water soluble constituents.

Zinc hydrosulphite has been used for many years by some mills as a reducing bleach for groundwood pulp. Lately, however, interest has centered in the development of sodium and hydrogen peroxide for bleaching groundwood. Usually from 0.1 to 0.2 per cent active oxygen as peroxide is used together with 3 per cent to 5 per cent sodium silicate on the weight of the pulp. One company recommends the use of magnesium sulphate as a stabilizing agent in its sodium peroxide bleaching solution—about 5 pounds per 2500 gallons of bleaching solution. After the stock is removed from the decker chest, the bleach solution is usually added to the stock in a mixer. The stock is then run into tanks where it is held a sufficient time for the completion of the bleaching reaction. Following

this reaction, a reducing agent such as sulphite cooking acid is added in a mixer and the stock is then run into the heater chest. A brightness increase of 5 to 10 points is normally obtained with the concentration of active oxygen mentioned above.

Another company recommends the use of about 0.5 per cent available chlorine as hypochlorite prior to the use of peroxide, for greater peroxide efficiency.

In either case, unless some method is provided for heating the stock, it is necessary to adjust the size of the stock chests in such a way as to give sufficient reaction time at stock temperature.

Semichemical Pulp

Semichemical pulp, as its name connotes, is only partially purified chemically. The pulp is usually blown from the digesters with a 70 per cent yield, compared with about a 50 per cent yield after complete pulping.

Considerable work has been carried out on the bleaching of semichemical pulps to a high white but very little is being done commercially at the present time. Naturally, the first problem is completion of the purification. This is accomplished by the use of 15 per cent to 20 per cent available chlorine followed by alkaline extraction and hypochlorite stages, until the required brightness is reached.

Soda Pulp

Soda pulp is usually bleached to a brightness of about 70 to 75 G. E. Some soda pulp is bleached by the single-stage hypochlorite process, but demands for higher brightness and higher strength have shifted many soda mills to the use of chlorination followed by hypochlorite.

Sulphite Pulp

Sulphite pulp varies in chlorine demand from approximately 3 per cent to 8 per cent chlorine, depending on wood and pulping conditions. Some sulphite pulp is bleached in single- and two-stage hypochlorite bleaching systems. To produce a bleached sulphite of over 80 G. E. and of high strength, however, most mills use chlorination as a first stage, followed either by a caustic extraction and then a hypochlorite stage or by one or two hypochlorite stages. To produce a "hard" sulphite it is not advisable to include a caustic extraction because this removes pentosans and hexosans, thereby softening the pulp. For high alpha pulp, of course, it is necessary to use a high concentration caustic stage for purification.

Kraft Pulp

The greatest development in pulp bleaching processes has occurred in the production of bleached kraft pulp. The chlorine demand of kraft pulp may run from about 9 per cent to 12 per cent available chlorine. This chlorine demand figure does not tell the complete story, however, since the application of this quantity of chlorine in a single stage as calcium hypochlorite would not give the desired increase in brightness. The first stage must be chlorination, using elemental chlorine. As much as possible of the chlorine demand should be supplied in this way. Pipe line chlorination equipment now permits upwards of 70 per cent of the total chlorine demand to be added in the first stage. After an acid wash, a caustic extraction is employed to solubilize chlorinated products. Following the caustic extraction, one or more stages of hypochlorite are used, with the possible inclusion of a mild caustic stage between the hypochlorite stages.

An antichlor of sulphur dioxide is used following the final hypochlorite stage to control, as far as possible, the color reversion which may be caused by the presence of small amounts of available chlorine as hypochlorite in the washed, bleached pulp.

SOME PRINCIPLES TO BE CONSIDERED IN BLEACH PLANT DESIGN

1—Sufficient control must be instituted in the brown stock system so that the quality of each type of pulp produced is as consistent as possible. Pulp consistency must be closely regulated, and washing and screening of brown stock maintained at as high an efficiency as possible.

2—It is impossible to bleach pulp to a high brightness with poor water or an insufficient quantity of water for the proper operation of pulp washers. A large number of bleach plants are under-designed on washing capacity rather than over-designed in this regard. An increase in square feet per ton of washer capacity makes very little difference in capital cost but makes very great differences in the pulp produced.

3—The production of high brightness pulp at high strength requires efficient chlorination and caustic extraction in order to complete purification prior to the oxidation stages. The maximum use of chlorine in the chlorination stage and efficient removal of soluble materials in the caustic extraction stage cannot be over-emphasized in the proper design of a multistage bleach plant.

4—Careful consideration must be given to the pulp quality desired. Whether the finished pulp is to be used for glassine, book, writing, condenser, cigarette, or dissolving pulp has a bearing on the basic design principles as regards the number of stages and types of chemicals used. Basic design principles must also take into consideration the characteristics of the brown stock. It is unnecessary to design a bleach plant with a caustic extraction stage for Mitscherlich sulphite pulp. It would be equally impossible to produce a high quality dissolving pulp without using caustic for extraction purposes.

5—Continuous versus batch and semi-continuous pulp bleaching must be evaluated in terms of the size and daily output of the plant and the number and types of stocks that are to be handled by the plant. A batch plant is considerably more versatile if a variety of bleached pulps must be produced by the one bleach plant. Continuous bleaching should not be considered unless there is a fairly high output, probably from 75-100 tons per day, to set an arbitrary figure.

6—With brightness and strength requirements continually rising, new oxidizing agents such as sodium chlorite should be carefully considered and included in the design of multistage bleaching plants. In this way, fixed investment in additional stages can be saved, and the pulp that is produced will be of a quality which cannot be duplicated by conventional processes.

With fuller automatic control, increased use of corrosion-resistant materials, and an increasing use of new oxidizing agents, more of the pulp produced will be of brightness and strength not obtainable up to the present time. There will be a considerable increase in the use of peroxides for bleaching mechanical pulps to give superior groundwood printing papers. Additional investigations of the properties of lignin and coloring matter may point the way toward radical departures from present bleaching systems to processes utilizing newer chemicals and new processes for the more efficient production of high brightness-high strength pulp.

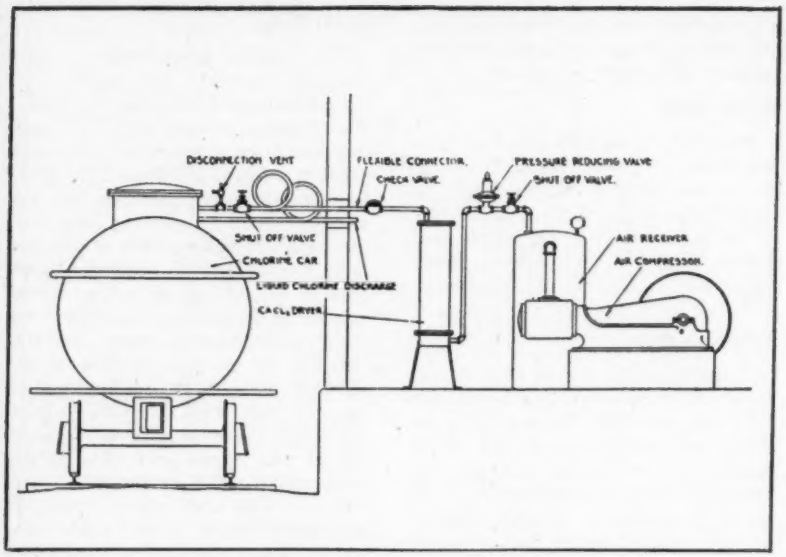


Fig. 3—Typical tank car handling system

It is generally possible to bring the pulp up to 75—80 G. E. with a small loss in strength when a 4-or 5-stage process is used as described above. However, if a high strength pulp with brightnesses in excess of 80 G. E. is required, use should be made of a sodium chlorite bleaching stage, since sodium chlorite bleaching achieves this brightness with no further degradation of the pulp. The type of chlorite process to be used must be dictated by various conditions, such as equipment available, results desired, and economics.

Rag Pulp

Rag pulp is bleached in a single-stage process, using either calcium or sodium hypochlorite or hypochlorite activation of sodium chlorite. In either process the bleaching of rags usually requires from ¼ to 1 per cent available chlorine, depending on the type of rags used.

In the hypochlorite process, the bleach is continued until nearly exhausted. The stock is then washed and dropped to a drainer where it may be held for from 3 to 10 days before use. Bleaching temperature is 40 deg. C. maximum, and the *p*H is usually maintained between 8 and 9. However, some mills reduce their *p*H to 6 or lower, in order to increase the rate of reaction. This procedure is not recommended because of the theoretical considerations discussed earlier.

The bleaching of rag stock with hypochlorite activated chlorite has been very successful. The same cycle as described above may be used, or the stock may be thoroughly mixed with the bleach liquor containing 1:1 to 3:1 hypochlorite to chlorite at a *p*H of 8.5 to 9.5. After being mixed and partially bleached, the stock may be dropped directly into the drainer. Normally the viscosity of rag pulp will decrease 30 per cent to 50 per cent in the drainer, but in the chlorite activation process there is practically no decrease in viscosity, thus giving the advantage of increased strength.

Other Types of Pulp

Waste or de-inked papers are usually bleached in a single stage with calcium or sodium hypochlorite. In many mills this is done in washers similar to those used for bleaching rag stock. The concentration of available chlorine required varies from about ½ to 1 per cent on the weight of the stock.

Manila, hemp, jute, etc., are usually bleached to a semiwhite by the use of 3 per cent to 5 per cent available chlorine as sodium or calcium hypochlorite in a washing engine. Temperature is maintained at 40 deg. C. maximum and time is controlled by exhaustion of the bleach. The *p*H should be maintained between 8 and 9.0.

During the war, with the stoppage of linen from abroad, domestic hemp and flax were substituted for linen fibers in the manufacture of very high grade bank note paper. Initial attempts were made to bleach this pulp with hypochlorite, but removal of the shives required a concentration of hypochlorite that degraded the pulp to a viscosity of 10 to 15 centipoises. The process finally developed uses chlorination and alkaline extraction, followed by acid chlorite. The pulp produced is highly satisfactory, with a very high viscosity. The chlorite bleach is carried out in a stainless steel washer type engine at a *p*H of about 4.0 and temperature of 140 deg. to 150 deg. Fahr.

BLEACHING EQUIPMENT

Bleaching Engines

The simplest bleacher was the *Hollander* washer similar to that used at the present time in many rag mills for washing and bleaching. This beater bleacher was very inefficient in its use of power, and with the increase in chemical pulp production better equipment was needed for bleaching.

The *Bellmer* type bleaching engine was a step forward. It consists of a tub shaped somewhat like a beater, with one or two mid-feathers. The pulp is circulated around the tub, which is usually tile-lined concrete, by means of a helicoid screw propellor. These engines handle consistencies up to about 7 per cent. Stock and bleach liquor are added together and then brought up to bleaching temperature, usually by means of direct steam addition. A single-stage Bellmer bleach usually requires from 4-6 hours, with the reactions depending upon brightness desired and chlorine demand.

High density bleachers were developed by Wolf and improved by Fletcher. These engines are vertical units consisting of a cylindrical tank with a central draft tube and a rotating helicoid screw. A scraper foot on the bottom of the screw draws pulp to the center of the bleacher. The charge circulates up through the tube and down through the annulus of the bleaching cell. Modifications of this basic processing equipment are many, changing the circulation, ratio of draft tube area to outer annulus, drive of helicoid screw, etc. These units usually handle stock from 10—20 per cent consistency.

Low density bleachers are usually designed with an outer cylindrical shell of tile or concrete, and an inner shell of similar material. The bleacher has a cone-shaped bottom serving as a throat for a pump impeller which can circulate the stock in either direction around the inner shell.

Continuous bleaching systems utilize towers through which the stock passes continuously, while the bleaching reactions are completed. Continuous systems require even pulp quality, careful control, good mixing of chemicals with pulp, and no stratification in towers. Naturally, the advantages of a continuous system are lower labor cost and reduced plant size for a given output, both resulting in lower cost of bleaching.

(Turn to page 537)

Activated Silica Sol in Water Treatment

F. ROBERT MacGONAGLE
Philadelphia Quartz Company

THE USE OF ACTIVATED silica sol, while comparatively new, has created considerable interest in the paper industry. Variations in surface water supply require the continual alert attention of chemical engineers who are responsible for controlling the quality of water for mill use. The ever-increasing demands for higher standards of brightness, color and other characteristics in paper and paper products, which depend upon the clarity and low color of the water supply, more and more emphasize, in the minds of mill management, the importance of the water purification plant.

Straight sedimentation or settling alone, while valuable at times as a pretreatment, is entirely inadequate for proper conditioning of the water prior to filtration through rapid sand filters. Finely divided impurities of colloidal dimensions such as silt, color and microorganisms require chemical treatment by the addition of a coagulant to gather them together and entrap them in the form of a floc so that they will be filterable. The floc, thus formed, must be of a nature that it will remove as much of the impurities as possible from the water, that it will be tough in character in order to prevent redispersion and that it will be of sufficient weight to allow rapid settling. When properly used, in conjunction with the coagulant, activated silica sol aids materially in attaining these desired characteristics.

Reactants for Sol Formation

The technic involved in the production of a properly activated silica sol is basically simple. It involves the selection of the proper grade of sodium silicate as a source of silica. Usually, a sodium silicate of an approximate analysis of 8.9 per cent sodium oxide and 28.7 per cent silica is used, although a grade slightly more concentrated is sometimes employed. The silicate is diluted to a predetermined point and then reacted with the proper amount of any of a number of chemicals to remove the soda from the silica. The sol is aged for a specified time and then again diluted to stop further aging. This is fed into the system at a rate which gives the required dosage at the rate of the water pumpage.

The early history of attempts to produce a satisfactory sol has been reviewed by Hay (*1*) and will not be repeated here.

Baylis (*2*) in his studies involving the optimum chemical treatment for the new South District Filtration Plant for the City of Chicago, which uses Lake Michigan water, perfected a technic of neutralizing the dilute silicate 85 per cent with sulphuric acid. In reporting his work, Baylis (*3*) pointed out that, in addition to sulphuric acid, any acid or acid salt might be used for the purpose.

Working simultaneously but independently, Graf and Schworm (*4*) of the St. Louis (Missouri) Water Works developed a technic in conjunction with softening involving the reaction of silicate with alum to produce a sol. This sol seems to be particularly effective in waters of very high turbidity such as are encountered at the treatment plant in St. Louis and the Missouri Valley.

Baker and Dedrick (*5*) invented a process, known as the N-Sol B Process, whereby just enough alum is added to the silicate to partially neutralize the alkalinity and, after aging, additional alum is used as the coagulant.

Hay (*6*) has made a contribution in his invention of the use of the ammonium sulphate as a reacting agent, referred to as the N-Sol A Process. The ammonia is replaced by the sodium liberating the silica and goes into solution in the water.

It is therefore available for subsequent production of chloramines if this agent is desired for sterilization. If break-point chlorination is employed, the method is not applicable and there may be some objection to the ammonia content if the filtered water is to be used in boilers in conjunction with steam turbines where the ammonia may have a deleterious effect on the copper coils. It does produce an excellent floc and is highly recommended where it is applicable.

Klinger (*7*) reports preparation of sols using the above reactants and also the use of sodium acid sulphate, sodium bicarbonate (known as N-Sol D Process), chlorine gas, (N-Sol C Process) and sulphur dioxide. With all these reactants, he has produced successful sols on a plant scale. Doubtless, additional reactants will come into use from time to time as the state of the art advances.

Optional Methods of Preparation

When the technic was first developed, the sol was invariably prepared by the batch method (Figure 1). It involved the dilution of the required amount of silicate, the introduction of the required amount of diluted reactant with proper agitation and then an aging period at proper concentration. Following this, the sol was further diluted to a predetermined concentration and fed into the system.

The batch method requires a mixing and aging tank of sufficient size and a storage tank from which to feed the sol while another batch is being prepared. In order to avoid the necessity of providing relatively large tanks and the labor involved in mixing individual batches, methods of continuous preparation (Figure 2) have been devised. These methods involve the proportioning of the sodium silicate, water, and reactant into a comparatively small tank, provided with agitation, so that the resulting mixture will be at the aging concentration. Constant feed pumps are useful in proportioning the various components. In order to obtain proper aging, the sol may be passed from the mixing tank through an aging tank of sufficient size to accomplish the necessary aging time and fed from there to the system without further dilution.

Determining Proper Magnitude Of Additions

In order to study the benefits to be derived from the use of activated silica sol in an individual water, preliminary laboratory jar tests are essential. Specific volumes of the water are added to containers which are provided with equal agitation to simulate plant conditions and the character and settling qualities of the resultant floc studied. Proper order of addition, *p*H control and the magnitude of reactants to give optimum results can be determined. Hay (*6*) has given suggestions for these studies as well as directions for the preparation of some of the reactants for laboratory studies.

Effects of Activated Silica Sol on Floc Formation

Generally, the first observable effect of the addition of the sol is the formation of a larger, heavier floc. The floc is tough in nature and differs from the ordinary floc in that it will reform when broken up by agitation. The characteristics of the floc are exhibited clearly in a jar test. In view of its negative charge, the silica sol tends to neutralize the excessive positive charge on the coagulant, allowing more com-

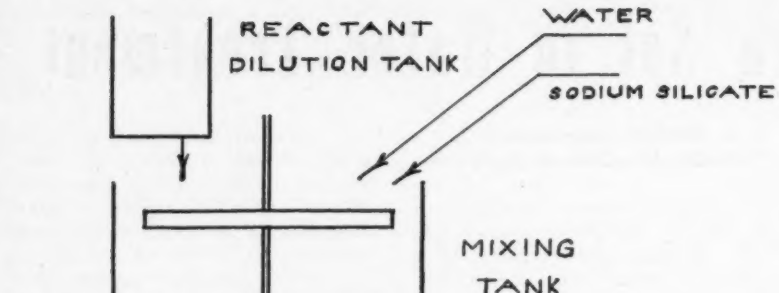


Fig. 1—Batch preparation

plete flocculation and more rapid settling.

It has been generally recognized that, in order to obtain greatest flocculation, a critical *p*H range is required dependent on the specific coagulant employed. This is not the whole story as it is well known that a certain minimum alkalinity must be present in the water to hydrolize the coagulant. Given the required alkalinity, experience has shown that the silica sol tends to broaden the *p*H range of effective coagulation.

It has been the experience of various investigators that the utilization of activated silica often results in economy in the use of coagulants. This has been found in the use of alum for color removal and also in the reduction of turbidities. Thus, the use of silica sol often yields economies which offset the cost incident to its use.

A series of jar tests usually demonstrates an additional advantage in the rapidity of the floc formation. Fast floc formation is of particular interest to plants where the floc conditioning time may be limited due to increases of load beyond that which the plant was originally designed to handle. More rapid settling likewise aids in this respect.

Effects of Activated Silica Sol on Filtration

Owing to its nature, the floc produced with the aid of activated silica sol acts differently on a filter bed than the flocs formed by one of the standard coagulants alone. Because of its weight, much less floc reaches the bed, but that which does, although small in quantity, does not penetrate the bed as, for instance, a straight alum floc. Because in some sections, fine filter sand is employed for algae removal, etc., there may be a tendency for the silica floc to actually plug the bed by coating the surface unless the conditions are recognized and proper precautions are employed.

It is possible to go to larger sand size and take advantage of the higher flow rate resulting. Many plants, however, find it advisable to retain their filters in their present condition. For these, the use of surface washers will prove advantageous. These washers are beneficial with either sand or Anthrafilt. Another scheme, which is sometimes successful, is to preserve a certain ratio between silica sol and the coagulant.

The above comments should not be construed to indicate that there is any certainty of running into this difficulty but it should be recognized that the conditions, if met, can be successfully eliminated. When properly adjusted, mill experience has been that the use of activated silica sol has resulted in extending the filter runs in both warm and cold weather.

During cold weather, the water in the clear well often becomes cloudy due to after-precipitation of the alum following filtration. It is especially true under cold weather conditions when the alum dosage is relatively high. With the use of activated silica sol, this after-precipitation has been eliminated. The general result is a sparkling clear water of very low color.

There has been some apprehension expressed at times that the introduction of silica as an activated sol might increase the silica in the finished water. Experience has proved that the contrary is true. Noreus (*8*) reports that, in addition to getting improved results in coagulation with attendant increase in his plant capacity, no increase in silica was found in the finished water. Klinger (*7*) reports an extended study involving measurement of the silica content of the raw and finished water under conditions with and without the use of activated silica. When activated silica was employed, *a much greater reduction* of the silica content of the raw water was accomplished than when the coagulant alone was employed.

All of the advantages, above noted, have been observed in studies of several years duration. It is recognized that various waters react differently so that no positive prediction can be made prior to tests.

Jar tests have been shown to be a reliable indication as to advantages which can be expected in the plant. It must be stressed that imperfect plant design often prevents chemical treatment from accomplishing desired results.

Under conditions of proper design, jar tests should forecast the advantages obtainable in a full scale operation and should encourage trials in the plant itself. Sufficient evidence, under various water conditions, has been accumulated to emphasize the desirability of the investigation of the benefits of activated silica sol by any mill requiring water of greater purity than that available from its raw water source.

Other Paper Mill Applications

In view of the pressure on the part of various States in the direction of stream purification, there is an increasing effort on the part of industries, as well as municipalities, to clean up the effluents to the rivers. The paper industry is very active in co-operating in this problem and, with the back-

(Turn to page 538)

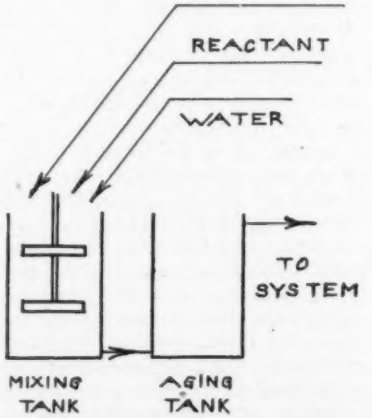


Fig. 2—Continuous preparation

B. T. U. in the Paper Industry

GEORGE R. WADLEIGH, Consulting Engineer

The purpose of this article is to outline a method of approximate accounting for utilizing the B.t.u. in such a manner as will show the nontechnical manager, general designer, departmental superintendent, and operator what is to be gained or lost by using more or less heat in an operation—more or less power as kilowatts. The term "power" will be used as covering B.t.u. in any form.
—AUTHOR'S NOTE.

▶▶▶ THE B.T.U. as related to the pulp and paper industry is readily divided into two parts: production and utilization. Much thought and engineering study are commonly given to the economies of production; relatively little to the economies of utilization.

As the cost of power usually is from 10 to 20 per cent of the cost of the goods made, any saving in power operating cost in normal times is reflected directly in profits—a factor which should appeal to management to a much greater degree than is usually the case. The situation has come about largely through the common limitation of the power man's scope to the making of power—also because heat utilization literature and accountings are couched in highly technical langauge and too detailed figures.

All the knowledge concerning B.t.u. production in any form, available to the public utility operator from years of close engineering records, from the Edison Institute papers, etc., is available to the power plant engineer. In the utilization, excepting for the conversion of a part of the energy to kilowatts and the making of compressed air, there is little exact knowledge extant. To be sure, there is certain information concerning evaporators, heat exchangers, power for pumping, fans, paper machines, lime kilns, and the operation of conveyers which is of use if a large number of qualifying conditions are fulfilled. Also, there are distinctly vague figures as to barking drum performance, chippers, agitators, screens, refiners, etc. Excepting for the very largest pulp and paper companies, however, there is little correlation of this information that can be utilized by the men responsible for design and operation. Such correlation often requires much chemical training.

Many articles on power plant accounting for the paper industry have been written. Practically all of them assume that the function of the power plant is to produce steam and kilowatts at the lowest cost. That assumption is true for public utility plants selling only one product. For the pulp and paper power plant, however, the most economical operation comes from the lowest over-all cost of production and the best utilization of the several products used directly by the mill, i.e., (1) kilowatt hours; (2) intermediate pressure steam at, say, 160 lb.; (3) low pressure steam at, say, 30 lb.; (4) warm water, and (5) compressed air.

Possibly at some time the gases from the furnaces containing much heat will be utilized in process by the mills. At present, this utilization is not accomplished except in the case of gases from recovery furnaces.

A high pressure steam generating plant is common to pulp and paper mill operations. Such a plant sends its product to bleeder turbines from which come the several products mentioned previously except compressed air, which comes as a corollary to the kilowatt hour. Sometimes a low pressure plant is connected to the system, thus complicating the operation and accounting.

If nontechnical figures showing the immediate effects of process and machinery changes upon steam and power operating costs were readily available, they would be of much use in deciding upon the advisability of a contemplated change. The control accounting should be set up so as to give these so-called "increment" costs quickly.

Moves within a range of, say, 10 per cent of the plant capacity (unless requiring the start-up of additional units) affect practically only the fuel bill, water supply, and power driving pumps and fans. The change in cost other than fuel is generally so small that it can be neglected in estimating costs of the type under discussion.

Since the accuracy of the measuring instruments determining power plant costs is rarely better than a second significant figure, it is quite unnecessary to carry out any cost figures to the four or five places often presented.

Mill power figures as commonly kept are made up of three parts: operating, overhead, and fixed charges. Monthly cost sheets show these broken down into steam generating costs and electrical generating costs. To get a unit cost, the former are often divided by 1000 pounds of steam, the latter by kw-hr. used. Since most of the turbogenerators are of the extraction type, various credits are given to the generator for steam exhausted and used in process. The resulting figure of kw-hr. cost comes out as an average of all produced before reaching the several exhaust pressures. This average does not tell the story for the increment change.

Another method is to use a unit of one million B.t.u. (called a meg.) for both products.

Both methods are faulty. One thousand pounds of steam at 550 lb. have much more value than 1000 lb. at 30 lb. Further, one million B.t.u.s (a meg.) is of far less value in condensing water than a meg. as machine condensate. Some day a unit embracing B.t.u. and temperature head will be developed for process use. There is too little standardization of equipment and methods at present to make such a unit of much practicality.

Likening a pulp and paper mill power system to the products of a dairy, the kw-hr. represents the cream; the 160 lb. steam, the marketable milk; the 30 lb. steam, the skim milk (of use in making casein), and the condensing water heat, the whey. Whey has no value as far as known. Condensing water heat, however, differs by having much value. Too commonly it is thrown away and given no accounting on the control books. Time was when no one inspected mill sewers for pulp. In due time the sewers of a mill will be inspected for heat losses, and when that is done, a large proportion of the value of the coal pile will be saved. The papermaker should demand process water at constant temperature.

If the pulp and paper heat engineer had more authority over design and operation, no condenser would be required where process steam demands are large. The same thought applies in the case of a steam plant connected to a hydroelectric plant, where the power balance is maintained by a reducing valve rather than by a condenser. For either of such plants the accounting methods outlined herein would not be directly applicable.

Where a condenser is used (there is always some load carried by steam to the condenser), kilowatts so produced are the most expensive. The use of

kilowatts beyond those made from process steam should be discouraged. The cost of kilowatts made to condenser by the least economical unit on the line will set the working cost of a kilowatt.

Some plants are connected into a public service system. If the paper mill plant has modern equipment, the least bought from the public utility, generally the better. This procedure again sets a maximum unit cost for kilowatts used.

Once the power plant size is established, the fixed charges are practically out of the hands of the general designer or operator so they are of little interest to the man in charge. Likewise, overhead—a proportion of mill supervision costs, sometimes a proportion of some operation such as trucking, yard crew, etc., is out of the control of the power plant engineer.

Mill accounts should show:

(1) Items changed by moderate alterations in the load—practically all fuel with very small additions on account of water, and pump and fan power.

(2) Items within the control of the plant operator—scarcely affected by moderate changes in load. These items are ash disposal, operating labor, electric power, supplies, repair material, repair labor, auxiliary steam, and hot water returned from process.

(3) Items entirely out of the hands of the operator—depreciation, taxes, workmen's compensation, proportions of general expense.

The totals of these items on the control books should show the total cost of operating the power plant.

To best explain the situation, let us assume a relatively simple plant providing B.t.u.'s for a mill making 250 tons of chemical pulp per day and shipping an equal weight of paper. The average kilowatt load will be 16,000 with a power factor of 93 and load factor of 90.

The steam would be generated at about 600 lb. pressure and be delivered to the turbines at

	Gauge Pressure lb.	Superheat deg. Fahr.	Total Temp. deg. Fahr.	Total Heat	Lb. required to make 1 kw-hr.	Kw-hr. per 1000 lb.
The turbine will exhaust steam at	550	200	680	1341	..	..
	160	100	491	1255	48	21
	30	10	284	1177	25	40
Steam to the condenser will exhaust at	Vacuum 28	0	100	1103	11	91

The value of the several steams exhausted for process purposes is not in parallel with their B.t.u. The temperature factor is a large but by no means exact one, affecting greatly size and cost of process equipment at the time of operation. Digesters would practically cease operation at 30 pounds, yet the heat therein is only 6 per cent less than that at 160. Conversely, drying with 160-lb. steam would require conventional dryers of such strength that the first cost would be prohibitive, while operating evaporators at higher pressure would be in much the same category.

Condensing water at 75 to 100 Fahr. is too commonly given no value in power plant accounting though its use in northern mills for process can effect large savings. To evaluate this item with only 6 per cent less heat in it than 30-lb. steam would complicate the proposed accounting too greatly. Any value to this heat is omitted from this paper.

The common steam table gives a total heat value above 32 Fahr. As the draft on the coal pile, omitting air heating, commences at water supply temperature, the heat in water at this temperature will be taken as a base (62 Fahr.) from which to measure the process values of the several steams. This is by no means an exact method but is offered as the best at hand at present.

Some day the author hopes that this whole mill heat utilization problem will be taken up by a mathematical brain capable of integrating many variables. Such a mind as has developed radar control and many other processes involving high grade physics is needed. Such a man could include all of the factors in the problem instead of the few within the scope of this article.

The plant accounts should appear with the following operating subdivisions:

Steam Production
- Fuel
- Ash Disposal
- Production Labor
- Water (Boiler Feed and Wash Water)
- Electrical Power
- Supplies
- Repair Material
- Repair Labor
- Auxiliary Steam from the Process Supply

Power and Process Steam Production should be divided into:
- Steam (from the boiler house)
- Operating Labor
- Water
- Supplies
- Repair Material
- Repair Labor

For the assumed steam plant the figures for a typical month of steam production would appear about as follows:

Fuel—9,150 tons coal	$54,000	
Production Labor	9,000	
Repairs (Material, Labor & Supplies)	10,000	
Water and Auxiliary Power	1,000	$74,000
Depreciation and Interest	$10,000	
Insurance, Taxes, Workmen's Compensation	2,000	
Proportion of General Expense	2,000	$14,000
Total		$88,000

For this figure there has been produced 194 million pounds of 600-lb. steam which on the control books cost 45.5 cents per 1000 pounds. If more or less than this quantity of steam is produced within the economical range of the equipment, coal, auxiliary power and water only are affected. Therefore, the increment figure is $55,000. This amount divided by 194,000,000 equals 28.4 cents or with some 5 per cent of the steam being used within the boiler house, by 185,000,000 pounds gives a figure of 29.7 cents per 1000 pounds as the cost of the power house. [*c shown following several references hereafter indicates cents.*]

This 185,000,000 pounds in the power house is turned into 10,016,000 kilowatt hours plus two process steams and warm water.

To complete this operation requires turbogenerators, condensers, pumps, attendants, repairs and supplies which on the control books would be broken down about as follows:

Operating Labor	$10,000	
*Water (mostly condensing)	.....	
Supplies, Repairs & Repair Labor	10,000	$20,000
Depreciation & Interest	$9,500	
Int., Taxes, Workmen's Compensation, etc.	2,000	
Proportion of General Expense	2,000	$13,500
Total		$33,500

(*) No charge is made for water as much of the year the water goes to mill process and the heat therein more than pays for the power plant share of the general water supply system operation.

If no process steam was used, the amount of steam from the boiler house would produce 16,800,000 kw-hr., or an average of 27,000 kw. per hour. This figure does not enter into this accounting. Nevertheless, it is interesting as it indicates the amount of energy required from the boiler house for process heating.

Each 1000 pounds of steam sent to the condenser, using the assumed water rate of 11 pounds, will produce 91 kw-hr. Practically no other variable cost is introduced in the transfer of high pressure steam to useful process form. Therefore, the increment cost per kilowatt is 29.7c divided by 91, or $.00327. Since about 5 per cent of the kilowatts are required within the power house, the base cost should be revised to $.00344.

Above river temperature (the base) the several steams considered have useful heat therein, as follows:

550 lb.	160 lb.	30 lb.
680 t.t.	491 t.t.	284 t.t.
1311 B.t.u.	1225 B.t.u.	1147 B.t.u.

In percentages of process value of the original boiler house steam, these figures become respectively: 100 per cent, 93.5 per cent and 87.5 per cent.

Using 1000 pounds of steam as a unit of variable process values, the figures, based on the increment cost of high pressure steam as 29.7c and kw-hr. as $.00344, develop as follows:

1000 lb. at 160 lb. (.297 — 21.0 × .00344) × 93.5 = 21.0c

1000 lb. at 30 lb. (.297 — 40.0 × .00344 × 87.5 = 14.0c

To present this data in the form of a general equation,

Let F = the fuel cost (increment) of high pressure steam per 1000 lb. to turbines

C = the kw-hr. made per 1000 lb. of steam to the condenser condition.

Then A equals F divided by C (equals the increment cost of the most expensive kilowatts).

Let B = kw-hr. made per 1000 lb. of steam to the bleed point under consideration.

H-R = the available heat in high pressure steam above the river level heat.

h-R = available heat in the bled steam above river temperature level.

f = the increment value of a unit quantity (1000 lb.) of process steam.

Thus the formula becomes

$$f = (F - B \times A) \times \frac{h\text{-}R}{H\text{-}R}$$

These several figures modified to suit each plant by differences in fuel cost, evaporation rate, boiler house steam qualities, turbine efficiencies, process steam qualities, water cost, river temperature, etc., will give the process man reasonably definite figures to use (with transmission loss added) in working up his heat projects instead of a guess or an average over-all cost from the control books as is now too common a practice. As examples:

The pulp mill needs more hot water at a temperature suitable for use of 30 lb. steam. Starting from river temperature, the increment power plant additional cost will be at the rate of 14.0c per 1000 pounds plus transmission loss for the amount of steam used.

An added pump is considered, requiring 50 kw. In this case the added cost to power will be 50 × $.0034 plus transmission loss rather than 50 × $.007 or some average figure derived from total power charges.

Perhaps a bark burner is contemplated to make, say, 3 lb. of high pressure steam per pound of bark. If the equipment is high pressure, any steam made will reduce steam production costs at the hourly rate of 29.7c per 1000 pounds, less any added labor and repairs and the kilowatts used in operating the burner. A low pressure boiler, if considered, probably fire tube, will have fixed charges half as great as will the high pressure boiler, but its steam will be worth only 14.0c per 1000 pounds.

If the demand is for greater pressure on dryers beyond the 30 lb. bleeder pressure, 160-lb. steam must be used. This steam will cost 21.0c per 1000 pounds plus transmission losses. The total steam cost charged, however, might be reduced through use of a thermocompressor using a portion of the 30-lb. steam.

In considering a recovery unit, the same reasoning as for bark burner would apply. At 160 pounds, probably fire-tube boilers could be used with much less labor for dust removal and greater net steam output due to simplified soot blowing. Such producing steam at 21.0c per 1000 pounds should be balanced against the 29.7c high pressure product.

Other such examples might be cited.

Many mills post, in conspicuous places, the daily financial loss through water waste orifices of various sizes. There is no good reason why steam and power wastes cannot be brought home to the average operator in the same simple way—using plain increment figures corrected monthly—with excellent returns to the management.

Pulp Bleaching . . .

(Continued from page 532)

Chlorination Equipment

In the past chlorine was added by means of an ejector or diffuser plate. The time required for chlorination was usually 45 minutes to one hour, and the difficulties of agitation and concentration in such a process can readily be understood.

The addition of chlorine in the pipe line between the brown stock pump and the reaction chest has been a very definite advance. It is easily seen that the continuous addition of chlorine, with efficient agitation, in the pipe line provides the most favorable conditions for the promotion of the primary chlorination reaction. The inlet ring for chlorine addition in the pipeline consists of a series of slotted nozzles set tangentially around the inside of a pipe section. The nozzles discharge into a region of lower pressure, provided by an enlargement on the pipe diameter following a restriction of the pipe. The design of the slots causes the chlorine to discharge at a velocity that imparts a swirling motion to the pulp, this motion being aided by helical baffles.

Bleach liquor is manufactured by the addition of chlorine to a milk of lime solution. The system most widely used employs a circulating pump with a chlorine aspirator in the circulating line. Chlorine is added during the circulation of the milk until the proper concentration is obtained, and the bleach liquor is generally settled and decanted into a storage tank. Figure 2 illustrates the general arrangement most frequently used for the manufacture of calcium hypochlorite bleach liquor.

Measurement of Chlorine Flow

The simplest method for measurement of chlorine flow has been to weigh the chlorine cylinder before and after a batch bleaching process. However, with continuous bleaching and the use of 16-ton and 32-ton single unit cars, it was necessary to develop better control devices.

For handling any sizable quantity of chlorine as gas it is necessary to vaporize liquid chlorine, 12,000 B.t.u. or about 15 pounds of steam, are required to vaporize each 100 pounds of liquid chlorine. Heat is usually applied by means of a water bath. Air pressure is applied to tank cars, during winter months, to give higher pressure, but the air must be thoroughly dried to prevent corrosion in the chlorine tank cars. Pressure reducing and automatic pressure regulation valves with a fixed orifice may be used to control the rate of flow. Rotameters may also be used for measurement of

flow rate. An illustration of a typical tank car handling system is shown in Figure 3.

Literature Cited

1) Hisey & Koons, *Paper Trade Journal*, Vol. 103, No. 6, Page 36, (1936).

2) Loeschbrandt, Bleaching of Sulphite Pulp, TAPPI, 1941.

3) White, Taylor and Vincent, Chemistry of Chlorites, *Industrial & Engineering Chemistry*, Vol. 34, Page 782, July 1942.

4) Jeans & Isbell, Chemical Reactions of the Chlorites with Carbohydrates, R. P. 1408, U. S. Department of Commerce.

◆

Activated Silica . . .

(Continued from page 534)

ground of successful application of silica sol for raw water purification, has turned its attention to its use in aiding the coagulation of mill wastes. Successful results have been obtained in many cases.

The clarification of white water and the recovery of solids in the form of short fiber and filler also constitute a coagulation problem. Studies have proved silica sol to be effective in white water recovery systems.

Higher retention of short fiber and filler on the wire is accomplished also by proper coagulation before the head box. Investigations of the utility of silica sol have demonstrated that it can be very useful in aiding retention at low cost.

Studies are being continued on these various uses and it is confidently anticipated that successes, already achieved, can be translated to other mills where similar problems exist.

Literature Cited

1) Hay, H. R., Water Purification Methods Involving Sodium Silicates. J.A.W.W.A., 36:626 (1944).

2) Baylis, J. R., Silicates As Aids to Coagulation. J.A.W.W.A., 29:1355 (1937).

3) Baylis, J. R., Composition of Matter for Water Treatment. U. S. Patent 2,217,466. (Oct. 8, 1944.)

4) Graf, A. V., and Schworm, W. B., Solution Mixture or Sodium Silicates Improve Coagulation. W.W.*Eng.*, 91:1038 (1937).

5) Baker, C. L., and Dedrick, C. H., Water Purification. U. S. Patent 2,310,009. (Feb. 2, 1943.)

6) Hay, H. R., Colloidal Silica As An Aid to Floc Formation. W. W. & *Sew.*, 91:211 (1944).

7) Klinger, L. L., Improvements in the Coagulation of Surface Waters with Activated Silica. *Paper Trade J.*, 122, No. 15:44 (1946).

8) Noreus, R. E., The Use of Activated Silica in the Coagulation of Highly Colored Waters. *Paper Trade J.*, 120, No. 11:45 (1945).

Bulk Density Factor Nomograph

D. S. DAVIS
Wyandotte Chemicals Corp.

▶▶▶ THE SPECIFIC GRAVITY of paper is of interest to manufacturers and users of a number of grades and a nomograph for calculating the specific gravity of test liner and chipboard in terms of the sheet weight and caliper has been presented (*1*). Some converters prefer to compute and record the bulk density factor, B.D.F., proportional to the reciprocal of specific gravity, according to the equation

$$\text{B. D. F.} = \frac{\text{Caliper}}{\text{Basis Weight}} \times 10^6$$

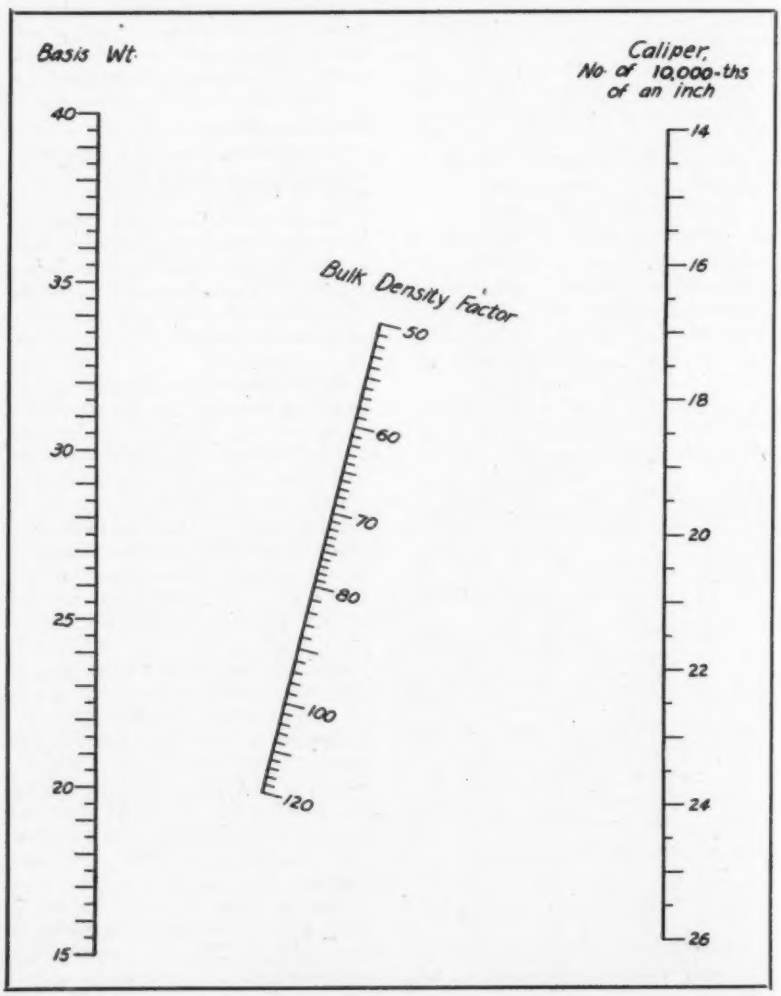
The accompanying nomograph, constructed by methods described previously (*2*), enables rapid and accurate calculation of the bulk density factor. The use of the chart is illustrated as follows: What is the bulk density factor when the caliper is 0.0020 inch and the basis weight is 25 pounds? Connect 25 on the basis weight scale with 20 on the caliper scale, graduated in number of ten-thousands of an inch, and read the bulk density factor as 80 on the inclined scale.

The basis weight scale is not limited to any particular ream dimensions or count but bulk density factors are only comparable when the basis weights are defined in the same manner.

Literature Cited

1) Davis, D. S., *The Paper Industry*, 13, 67 (1931); *Chemical Engineering Nomographs*, p. 106, McGraw-Hill Book Co., (1944).

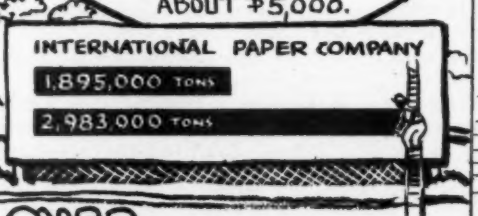
2) Davis, D. S., *Empirical Equations and Nomography*, Chap. VII, McGraw-Hill Book Co., (1943).



Paper SKETCHES . . . . . .

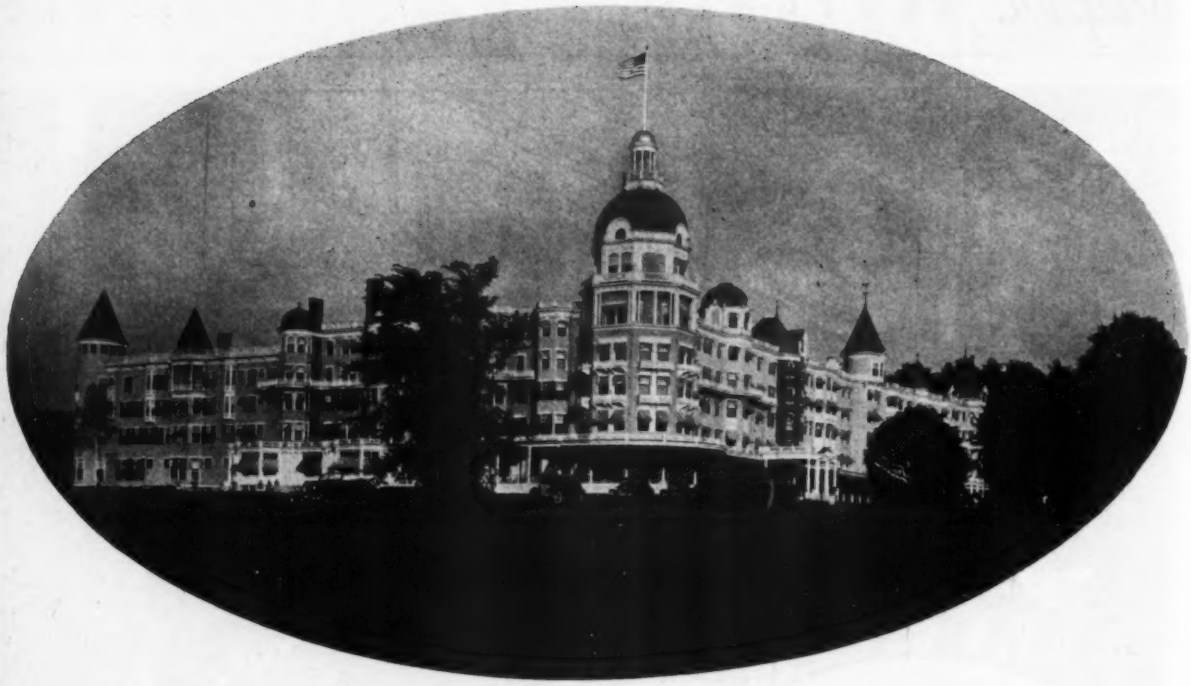
BECAUSE OF THE EXCISE DUTY, THIN, LIGHTWEIGHT PAPER COMMONLY WAS USED IN ENGLAND EARLY IN THE 1800'S.

BEFORE THE ADVENT OF THE PAPERMAKING MACHINE, THE AVERAGE INVESTMENT REQUIRED TO SET UP A TYPICAL ONE-VAT MILL IN THE UNITED STATES WAS ABOUT $5,000.



OVER THE TEN-YEAR PERIOD, JANUARY 1, 1936 – JANUARY 1, 1946, THE ANNUAL PRODUCTIVE CAPACITY OF THE INTERNATIONAL PAPER CO. WAS INCREASED FROM 1,895,000 TONS TO 2,983,000 TONS.

PAPER WAS BOUGHT IN LARGE QUANTITIES FOR THE TIME, TO FEED THE SIX PRESSES USED TO PRINT THE GUTENBERG 42-LINE BIBLE (1450-1455).



Superintendents Association

meets for third time at Poland Spring

▶▶▶ THE TWENTY-SIXTH annual convention of the American Pulp and Paper Mill Superintendents Association was held June 17, 18, 19, and 20, 1946, at the Poland Spring House, Poland Spring, Maine. It was the third time that the superintendents had met there in annual conclave. The first of the other two meetings was held June 20, 21, and 22, 1934; the second on June 17, 18, and 19, 1941.

As on the two earlier occasions, the convention this year was unusually well-attended. Not only were the Poland Spring House, the Mansion House, and Ricker Inn, all under the same management, filled to capacity, but also were the Summit Spring Hotel and other hotels in the vicinity. Registration of men and women totaled in the neighborhood of 1,000.

Although the convention formally opened on the morning of June 17, active registration started on the day previous. Likewise, on the evening of June 16, there was a dinner meeting of the Allied Industrial Affiliates of the Association, as well as a showing of motion pictures by W. L. Glass, of F. C. Huyck & Sons, Albany, New York.

The motion pictures featured the Southern States Pulpwood Producers, 1945, in which various practices employed in the South for tree felling, lopping of branches, bucking of merchantable lengths, and transporting of the pulpwood from the woods to the mills were highlighted in considerable detail.

At the Affiliates annual dinner, Norman Weil, of W. S. Tyler Company, as chairman, and John Cornell, of *Paper Mill News*, as secretary, presented their respective reports. Also J. N. Stephenson, of the *Pulp and Paper Magazine of Canada*, as a member of the Pulp and Paper Text Book Committee, concerned at present with an extensive program of revision of the textbooks *The Manufacture of Pulp and Paper*, appealed for co-operation on the part of suppliers to the industry. He requested that manufacturers of machinery and equipment furnish essential information concerning their products to the Text Book Committee as soon as possible.

The illustration of Poland Spring House on this page appeared in a souvenir pictorial booklet "A Keepsake," which was presented by Draper Brothers Company to those attending the Convention. The photograph is reproduced through the courtesy of Maine Development Commission.

At the same meeting, the following group chairmen were elected to head up the activities of the Allied Industrial Affiliates Committee for 1946-1947:

Chemicals—Ralph Kumler, American Cyanamid & Chemical Corporation

Wires and Felts—Morris D. Van Patten, Wm. E. Hooper & Sons Company

Clays, Starches and Fillers—Olney Steffins, Penick & Ford, Ltd.

Dyestuffs—Ivar Ekholm, National Aniline Division, Allied Chemical & Dye Corporation

Paper Mill Machinery— G. A. Peterson, Rice Barton Corporation

Auxiliary Equipment — Charles Muzzy, E. D. Jones & Sons Company

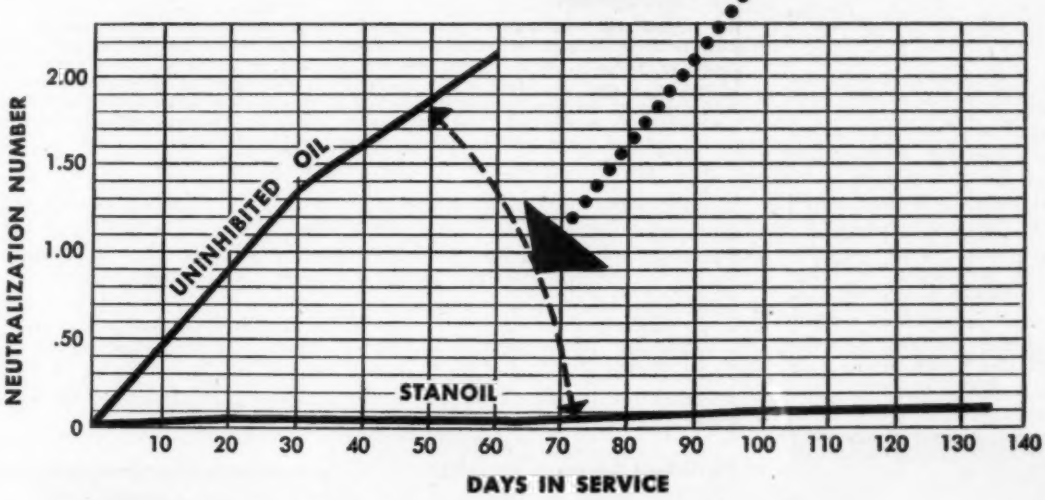
Power Plant Equipment—A. L. Hamm, Combustion Engineering Company

Materials of Construction, Maintenance and Supplies—J. G. Bucuss, Acme Steel Company

Control Instruments—H. O. Ehrisman, Foxboro Company

The chairmen of these several group committees elected Ralph Kumler as chairman of the Allied Industrial Affiliation Committee.

Here's the difference between uninhibited oils and Improved STANOIL



Oil lasts longer in gear cases . . . in bearings . . . in compressors . . . and hydraulic systems

THE CHART above shows the operating record of two oils in a speed reducer on an induced draft fan. Operating conditions were severe, as the fan ran 24 hours a day—so severe that a straight, uninhibited oil lasted only 60 days before acidity reached 2.15 mg.KOH/gm and the oil had to be replaced.

This was one spot chosen to test Improved STANOIL—a high quality mineral oil to which an oxidation inhibitor is added. The second curve shows the results. After 135 days of operation the neutralization number of the oil did not go over 0.15.

Deposits, corrosion and acidity caused by oil oxidation have been reduced in service tests on all types of equipment. A Standard Oil Lubrication Engineer will be glad to give you further information on Improved STANOIL and suggest installations in your plant where this oil can save machine down-time, oil replacements and wear. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Opening Session Devoted To Association Business

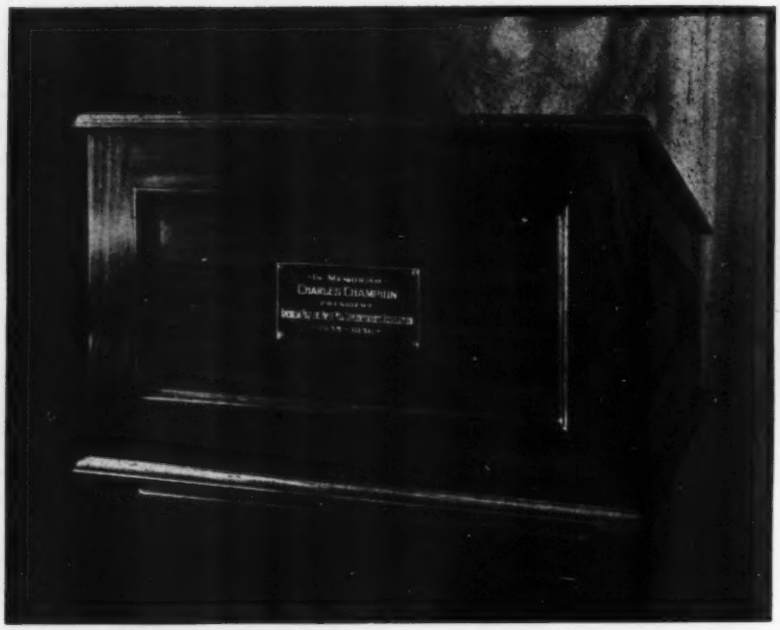
A business meeting on the morning of June 17 actually opened the formal proceedings of the convention. This meeting was presided over by Raymond L. Barton, president of the Association. At this meeting, invocation was rendered by the Reverend Albert Oliver, Calvary Methodist Church, Lewiston, Maine. Reverend Oliver also offered a Memorial Prayer following a reading of the Necrology by George W. Craigie.

The members who had passed on during the past year as read by Mr. Craigie were: Arthur F. Allen, George A. Bogle, Charles Champion, Albert E. Fuller, Edward P. Quinn, William A. White, and Almeron W. Wickham.

Association Presented With Lectern—Tribute To a Late Past President

At this same meeting, C. H. Kent, resident manager, Hercules Powder Company, Inc., Paper Makers Chemical Dept., Holyoke, Massachusetts, presented a solid black walnut lectern with inscribed sterling silver plate to the Association as a memorial to the late Charles Champion. The lectern was received for the Association by President Raymond L. Barton.

In making the presentation, Mr. Kent said that the lectern was presented to the Association on behalf of the host of friends of past president Champion who passed away on July 9, 1945, and that it was placed before the members and friends of the Association as a symbol of Mr. Champion's devotion to the Superintendents organization and its aims. Mr. Kent also expressed the hope that the use of the lectern at national meetings of the Association may ever be an inspiration to all who use it.



The lectern shown above was presented to the Superintendents Association by C. H. Kent, resident manager of the Paper Makers Chemical Department of Hercules Powder Company, Holyoke, Mass. The lectern was given as a memorial to the late Charles Champion, a past president of the Association. It is made of solid black walnut, a masterpiece of the New England woodworking craft. A silver plate bears the following inscription: "In Memoriam, Charles Champion, president, American Pulp and Paper Mill Superintendents Association, 1935-1936"

Following the acceptance of the lectern for the Association, Mr. Barton presented the President's Message for 1946.

President Barton's Message

In his message, Mr. Barton complimented everyone in the pulp and paper and allied industries for the part played in the winning of World War II. He also called attention to the establishment of the headquarters office of the Association in New York City, and to the resumption of divisional meetings of the Association last fall.

Mr. Barton thanked the divisional officers for their work, stating that many of them had served extra terms because of the war; and the Group Committee members who also served in their present capacities for two years, for their assistance in obtaining material for the *1945 Year Book* (published even though a convention was not held) and for arranging programs for the group meetings of the 1946 convention.

He likewise expressed appreciation for the splendid co-operation received from the Industrial Affiliates Committee; called attention to the second "Bolton Award Contest"; paid tribute to the splendid work of George W. Craigie as secretary-treasurer of the Association; and thanked the American Paper and Pulp Association and its secretary, E. W. Tinker, for continued interest in the welfare of the Superintendents Association and for the kind

Charles Champion, who served as president of The American Pulp and Paper Mill Superintendents Association 1935-1936. Mr. Champion passed away July 9, 1945

Raymond L. Barton, retiring president of The American Pulp and Paper Mill Superintendents Association

This fact has a definite reason behind it

Your GATES VULCO ROPES
Are Today Making Performance Records *NEVER EQUALED* by *ANY* V-Belts Before!

No V-Belts built by *anyone* before the war had anywhere near the strength and durability that was found necessary on U. S. Army tanks, tractors and self-propelled big guns during the war. Gates developed these greatly superior V-belts for Army use—and here is why this fact is important to industrial users of V-belts: —

Here is the reason

Every improvement developed by Gates for U. S. Combat Units—and many later improvements, also—have been added, day by day, to the quality of the Standard Gates Vulco Ropes which have been delivered to you.

That is why, *long before the war was over,* you were getting in your Standard Gates Vulco Ropes a product built to far higher service standards than any V-belts ever built by anyone before the war.

And that is not all of the story. Through continuing *specialized* research, the service qualities of these superior Gates Vulco Ropes have been still further improved as all of Gates facilities and energies have been returned to the service of industry.

These are the simple reasons why you are finding that your Gates Vulco Ropes are today outperforming any V-Belts you ever used before.

THE GATES RUBBER COMPANY
DENVER, U. S. A.
World's Largest Makers of V-Belts

All Gates V-Belts are Built With *The Patented* CONCAVE SIDE

Gates
THE MARK OF SPECIALIZED RESEARCH

467

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

assistance given the Association in many ways. He also thanked the *Paper Mill News*, as the official organ of the Association, for the job it had done in providing the members with news.

Mr. Barton related continuing growth on the part of the Association during the past few years; and expressed the hope that in days ahead the Association may be able to provide service to its members and to the pulp and paper industry of a scope greater than any accomplishment of the past.

The business meeting was concluded with the appointment of the following committees by Mr. Barton:

Nominating—Fred C. Boyce, Stanford G. Blankenship, William H. Brydges, Oscar Stamets, and Lester Smith.

Resolutions—Harry E. Weston, K. E. Terry, and Charles Reese.

Auditing—Homer H. Latimer, Raymond F. Bennett, and Ollie W. Messner.

First General Conference Session—With Homer Latimer Presiding

A general conference was called to order immediately upon the adjournment of the business meeting and with Homer Latimer presiding. This session featured two speakers: G. H. Petersen, director, Printing Testing Laboratory, S. D. Warren Co., Cumberland Mills, Maine, and G. R. Schenck, director industrial relations, Riegel Paper Corporation, New York City.

The subject of Mr. Petersen was *Problems of the Printer and how the Paper Industry Can Co-operate with Him;* of Mr. Schenck, *Some Reflections on the Responsibilities of Supervisors in the Field of Labor Relations.*

There also were two other general sessions during the course of the convention, the first in the form of a forum on improvements and developments in the paper industry with S. G. Blankinship as general chairman. The forum was held throughout the morning of June 19; the other general conference, the afternoon of the same day.

The forum covered *Woods Operation, Pulping, Stock Preparation, Paper Machines and Coating,* and *Engineering,* with the following men in the order named presiding over the respective portion of the meeting: George Fuller, H. Karberg, Charles Reese, Glen Sutton, and Ray Bennett.

Ray Bennett also presided at the general conference of the afternoon, the program including the presentation of two papers: *Molded Fibre Articles,* by Merle Chaplin, consulting engineer, Portland, Maine; and *Paper Making—an Art or a Science,* by Dr. Frederick Frost, director research laboratories, S. D. Warren Co., Cumberland Mills, Maine.

Part of Each Day Devoted To Group Meetings

The afternoon of June 17, the morning of June 18, and the morning of June 19 were given over to group meetings.

The first of these group-meeting periods included a Chemical Pulp session, with H. E. Karberg, Alliance Paper Mills, Ltd., Merriton, Ontario, Canada, as chairman; a Power and

Homer H. Latimer, newly-elected president American Pulp and Paper Mill Superintendents Association

Plant Engineers meeting with Roland A. Packard, Smith Paper, Inc., Lee, Massachusetts, as chairman; and a Board session with Ollie W. Messner of Robertson Paper Box Company, Inc., Montville, Connecticut, as chairman.

The Chemical Pulp meeting was conducted as a forum on pulp bleaching (sulphite, sulphate and groundwood). Vernon Woodside, Mathieson Alkali Works, served as panel moderator. Among the panel members were: Dr.. J. S. Reichert, E. I. du Pont de Nemours & Company, Inc.; Dr. John D. Rue, Hooker Electrochemical Company; R. C. Shearer, Alliance Paper Mills, Ltd.; Ferri Cosciani, Niagara Alkali Company; L. E. Russell, Mathieson Alkali Works; M. W. Phelps, Solvay Process Company; Dr. T. W. Toovey, Pennsylvania Salt Mfg. Company, and Robert McKeon, Buffalo Electro-Chemicals Corporation.

Four papers were scheduled before the *meeting of Power and Plant Engineers.* They were: Antifriction Bearing Lubrication on Paper Machines, by Donald T. Acorn, Socony-Vacuum Oil Company, New York City; Modern Dryer Bearing Lubrication Systems, by E. M. May, Bowser Company, Inc., Ft. Wayne, Ind.; Value of the General Maintenance Conference Held in Middletown, Ohio, by Homer H. Latimer, mill manager, Champion Paper & Fibre Company, Hamilton, Ohio; and Possible Applications of the Gas Turbine to the Pulp and Paper Industry, by D. G. A. Skrotzki, assistant editor, *Power,* New York City.

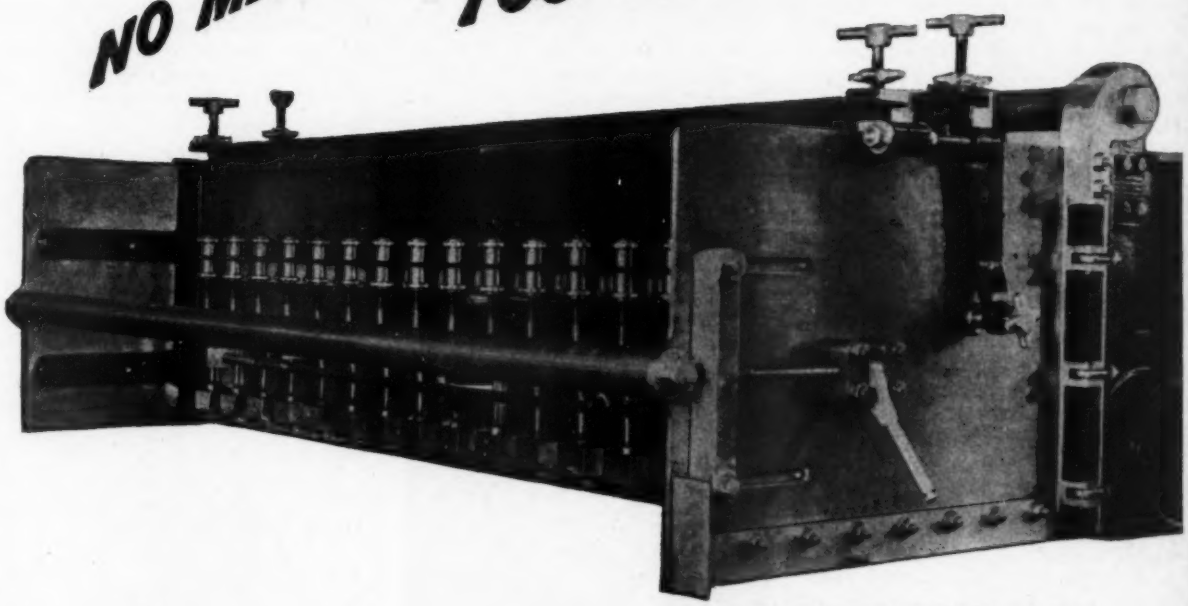
The program of the *Board meeting* included the presentation of three papers: New Thoughts on Drives, Screens and Vats for Cylinder Board Machines, by Allen A. Lowe, Sandy Hill Iron & Brass Works, Hudson Falls, New York; Stock Preparation, by Robert Vokes, Dilts Machine Works, Fulton, New York; and The Benefits of the Board Machine Air System, by William K. Metcalfe, J. O. Ross Engineering Corporation, New York City. Lantern slides were shown by Mr. Lowe in the presentation of his paper, while motion pictures were used by Mr. Vokes.

The group meetings on the morning of June 18 included a Fine Papers session, a meeting on Woodroom and Woods Operation, and a Tissue session.

The program of the *Fine Papers meeting,* with Robert M. Wishart, Oxford Paper Company, Rumford, Maine, listed as chairman, included the presentation of a paper by P. S. Sinclair, Sinclair Company, Holyoke, Massachusetts, on Possibilities in the New Dandy Roll Drive, as well as the presentation of several papers covering modern methods of stock preparation. The speakers listed for these several latter papers were: D. G. Sutherland, Sutherland Refiner Corporation, Trenton, New Jersey, R. F. Vokes, Dilts Machine Works, Fulton, New York, and C. W. Morden, Morden Machine Company, Portland, Oregon.

L. C. H. Beighey, Hammermill Paper Company, Erie, Pennsylvania, was chairman of the *meeting on Woodroom and Woods Operation.* This meeting was given over largely to the presentation of five films, the subjects of which are rather clearly indicated by the film titles: namely, Wood Handling and Process Equipment (shown by J. A. Fritz, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin; "Spare That Tree"—Worthington Hydrobarker (shown by T. Davenport, Worthington Pump & Machinery Corporation, Harrison, New Jersey); Developments in Portable Log Barkers and Other Wood Preparation Equipment (shown by C.

NO MATTER HOW FAST YOU SLICE IT . . .



A DOUBLE ADJUSTABLE *Monel slice built by the Pusey & Jones Corporation, Wilmington, Del. It is designed to handle a wide range of papers at speeds up to 600 feet per minute.*

Judge your slice blades on two basic counts.

— Do they resist acid and alkaline stocks, and machine white waters?
— Is surface smoothness easily maintained?

In both respects, Monel* slices rate high. They not only resist corrosion and pitting, but their dense, smooth surfaces never give slime and fibre a chance to cling.

Monel is stronger and tougher than other nonferrous, corrosion-resistant materials. It can be used in lighter sections without additional bracing.

On the **Pusey & Jones** machine pictured above, the Monel double adjustable slice serves in making papers ranging from 13-lb bond at 600 FPM to 65-lb cover stock at 200 FPM. The vertical blades are 26″ wide, and have a 16″ lateral movement. Distance between the blades can be varied from 4 inches to 7 inches.

The characteristics of Monel can be successfully used throughout the wet end, even in combination with brass and copper parts. Specify Monel for save-all pans and trays, head boxes, suction boxes, rods, rolls, rails and fastenings, as well as for slices.

Readily fabricated and welded, Monel withstands attack by corrosive stocks and white waters, alum, dilute hydrochloric acid and dilute sulfuric acid.

Get this helpful booklet

You'll find detailed information on further advantages of Monel in Technical Bulletin C-3, *Monel, Nickel and Inconel in Pulp and Paper Mills.* Ask us for your copy.

THE INTERNATIONAL NICKEL COMPANY, INC., *67 WALL STREET, NEW YORK 5, N. Y.*

MONEL

NICKEL (INCO TRADE MARK) **ALLOYS**

MONEL* • "K" MONEL* • "KR" MONEL* • "R" MONEL* • "S" MONEL* • INCONEL* • NICKEL • "L" NICKEL* • "Z" NICKEL*
*Reg. U. S. Pat. Off.

L. Durkee, D. J. Murray Mfg. Company, Wausau, Wisconsin); Portable Log Barker (shown by Nekoosa Foundry & Machine Company, Nekoosa, Wisconsin)—brief introductory remarks previous to showing of film were made by Charles Reese, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin; and Machine Knives in Industry (shown by J. D. McCready, assistant general manager, Simonds Saw & Steel Company, Fitchburg, Massachusetts.)

The Tissue meeting, with Joseph L. Hoolihan, Port Huron Sulphite and Paper Company, Port Huron, Michigan, listed as chairman, scheduled two papers and a motion picture. The papers were: The Mildew Proofing of Paper Mill Felts, by F. A. Soderberg, General Dyestuff Corporation, New York City, and Vortrap Applications and Operation, by F. C. Schilling and Harold E. Ingalls, Nichols Engineering & Research Corporation, New York City. The motion picture was: Paper, Pace Maker of Progress and was shown by William Greeley, F. C. Huyck & Sons, Albany, New York.

The last of the series of group meetings, scheduled for the morning of June 19, included a session on Coated Papers, a Kraft meeting, and a Board Session. The Board session was a continuation of the group meeting on Board that was held during the afternoon of June 17. The time was set aside for discussion of questions and problems pertinent to the paperboard industry.

O. W. Callighan, Edgar Bros. Company, New York City, presided over the *Coated Papers meeting*. The program of this session included the presentation of three papers.

The first of these papers was given by Edward A. Jackman, assistant personnel manager, Oxford Paper Company, Rumford, Maine. His subject was The Man in the Middle.

Lloyd M. Perry, chief chemist, Nashua Gummed & Coated Paper Company, Nashua, New Hampshire, presented the second paper. His subject was, The Converter Needs More Paper.

The third paper on the subject, Your Part in Lithography's Future, was presented by Wade E. Griswold, executive director, Lithographic Technical Foundation, New York City.

Claude S. Sorg, Sorg Paper Company, Middletown, Ohio, was listed on the program as chairman of the *Kraft meeting*. Also the program scheduled the presentation of two papers. One of these papers was The Effect of the Pulp and Paper Industry on Southern Forestry, by J. H. Allen, president, Florida Pulp and Paper Company, Pensacola, Florida, the other, Remote Control of Stock Preparation Equipment, by J. W. Couture, chief engineer, Dilts Machine Works, Fulton, New York.

Speakers of Note at Luncheon and Dinner Meetings

The luncheon and dinner meeting were as varied as the technical program. At the luncheon on June 17, the guest speaker was James Ritchie, Assistant Director, U. S. Pulp Producers Association, New York City. He spoke on Some National and International Aspects of the Pulp Situation.

Raymond L. Barton was toastmaster at this luncheon as he was at the dinner meeting the same evening. Following the dinner meeting, the rest of the evening was given over to dancing.

George W. Craigie, secretary-treasurer American Pulp and Paper Mill Superintendents Association

A picnic in the grove had been planned for mid-day of June 18; but inclement weather made it necessary to forego the original plan and to serve a buffet luncheon instead.

Norman O. Weil, retiring chairman of the Affiliates Committee was toastmaster for the dinner meeting of June 18.

The highlight of the entertainment following the dinner was a short talk by Jim Crowley, an All-American football player. Very cleverly he portrayed the technique employed by the late Knute Rockne of Notre Dame in pepping up his team before a game. He also related, perhaps in somewhat humorous, nevertheless genuine fashion, how football develops teamwork and thus friendships.

Since the afternoon of June 18 was given over to golf, horseshoes, and other games and sports, opportunity was taken at the dinner meeting to announce the prize winners.

The luncheons on June 19 and 20 were very informal. There was no formal program of any kind at either of them. However, the banquet on the evening of June 19 was an occasion for a number of short talks by celebrities at the speakers table. Allan B. Milham, president Byrant Paper Company, Kalamazoo, Michigan, was the toastmaster.

New Officers and Committeemen

In addition to the business meeting at the opening session of the convention, at which committee appointments were made, another meeting was held during the afternoon of June 19 at which time reports of the several committees were made and the election of officers held. Officers elected at this meeting for the following year were:

President—Homer H. Latimer, The Champion Paper & Fibre Company, Hamilton, Ohio.

First Vice President—Raymond F. Bennett, Ecusta Paper Corporation, Pisgah Forest North Carolina.

Second Vice President—Ollie W. Messner, Robertson Paper Box Company, Inc., Montville, Connecticut.

Third Vice President—Charles H. Reese, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin.

Fourth Vice President—James Fish, Paterson Parchment Paper Company, Bristol, Pennsylvania

Fifth Vice President—Charles E. Ackley, Crown-Zellerback Corporation, Lebanon, Oregon

With the exception of Mr. Ackley, all officers were elevated from the office immediately below—Mr. Latimer advanced from the office of first vice president to the presidency. Similarly, down through the list to and including Mr. Fish, who was elevated from fifth vice president to fourth vice president.

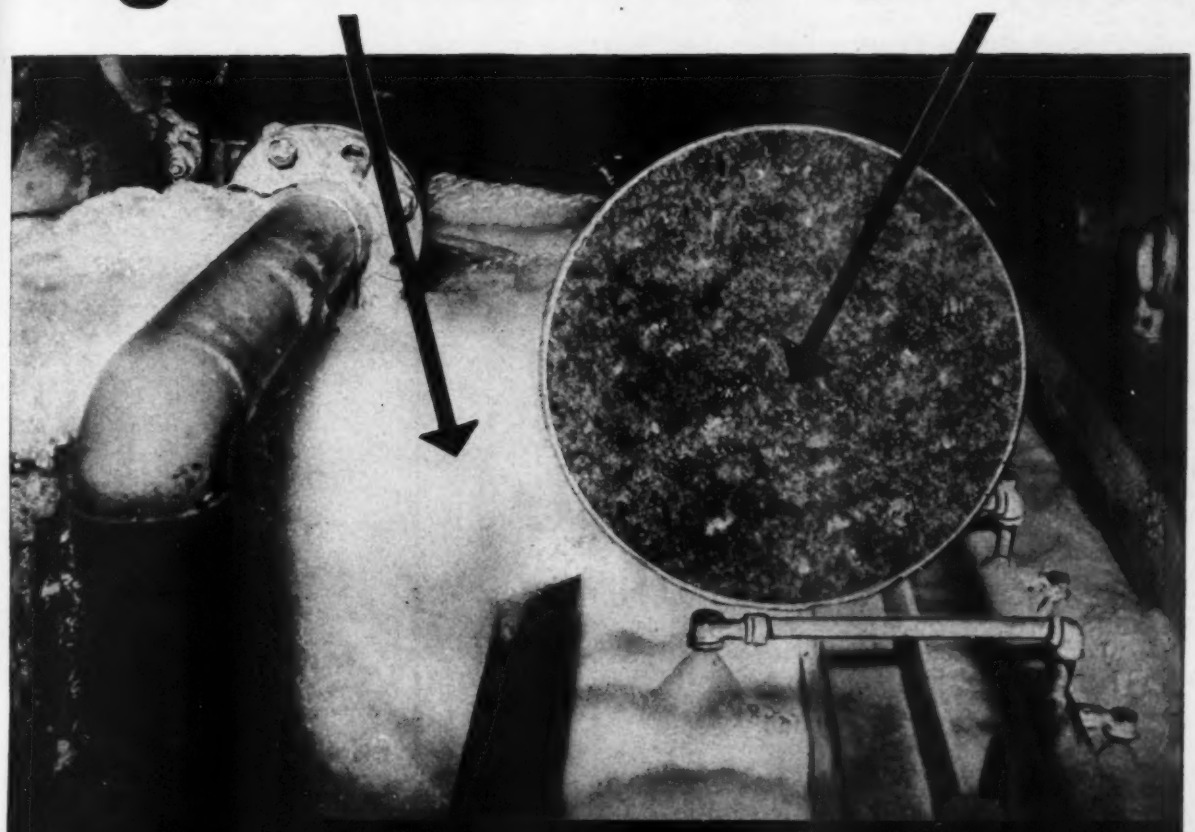
EDITOR'S NOTE: Abridgments of some of the papers presented before the Superintendents Association will be found in the section "Convention Papers . . . Abridged" of this issue.

◆

NAM TO COLLABORATE ON NEW SERIES RADIO PROGRAM

A series of radio programs will open July 6 over the Columbia Broadcasting System known as "Cross Section—NAM. The programs will be broadcast every Saturday for 13 weeks from 3:45 to 4 p. m., Eastern Daylight Time, and will be a presentation of the Columbia network in collaboration with the National Association of Manufacturers. The purpose of these

neglect this...and you get THIS



Foam causes faulty sheets

Failure to control foam in the head-box, cylinder vats, screen boxes, or on the wire jeopardizes paper quality through thin spots or faulty paper formation.

Don't give foam a full head—smash it *quick* with NOPCO-KF. It's not unusual for NOPCO-KF to clear the head-box of foam in less than two minutes, the wire in less than five minutes.

Thin Spots 75% Eliminated

Even in capacity operations, NOPCO-KF . . . the super "bubble buster" . . . dissipates entrained air—the common cause of thin spots—as if the stock were being handled at slower speeds. That's because NOPCO-KF keeps working on the wire. This positive foam control, plus better fiber dispersion, improves sheet formation.

Other NOPCO-KF advantages—reduced breaks, improved surface characteristics, increased water repellency, conservation of paper-making material. Test this NOPCO chemical—expressly formulated to aid sheet formation—in your *mill*. Order enough for a trial run. Write, wire or phone.

NATIONAL OIL PRODUCTS COMPANY
HARRISON, N. J.

Branches:
Boston • Chicago • Cedartown, Ga. • Richmond, Calif.

An affiliate of the American Pulp and Paper Mill Superintendents Association

NOPCO-KF

NOPCO **EVOLVED THROUGH RESEARCH**

programs is to help people get better acquainted with the Nation's business, large and small, and the people who manage it.

Dwight Cooke, CBS roving reporter, will visit managements of businesses in a different industrial center each week, talking with them around the microphone about what industry is doing and hoping to do, and about their problems and employees and customers. NAM's part in the program is to help select cities and the industries with the most interesting stories to tell, arrange contacts with company managements and secure their co-operation.

NEW YORK-CANADIAN DIV. SUPTS. TO HOLD FALL MEETING

The fall meeting of the New York Canadian Division of the American Pulp and Paper Mill Superintendents Association will be held at the Sagamore Hotel, Bolton Landing on Lake George. The meeting will last three days—September 12, 13 and 14.

The program calls for short, snappy, instructive business sessions, with top-notch speakers. There will be sports competitions with prizes and entertainment for all. Ives Gehring is the chairman. The central committee is manned by Earl Osterheldt, Gus Holm, and Jos. B. McLaren, who are planning for a successful and enjoyable meeting. Reservations should be made early.

◆

NEW ENGLAND SEC. TAPPI RE-ELECTS ITS OFFICERS

The New England Section of TAPPI re-elected all officers at its annual meeting held in Greenfield, Massachusetts. The members were welcomed to the meeting by Irving N. Esleeck, president of the Esleeck Manufacturing Company. The election was followed by an address on the subject "Man-made Textile Fibres, Especially those of Interest to Papermakers," by Herbert R. Mauersberger, technical editor of *Rayon Textile Monthly*, and lecturer at Columbia University.

New members elected to the executive committee were: R. J. Proctor, of Fitchburg Paper Company, and F. C. Young, Rising Paper Company.

Officers of the Section re-elected are: Chairman—L. B. Tucker, Crane & Company; vice chairman—Chester Childs, Merrimac Paper Company, Lawrence, Massachusetts; secretary—Henry Mellen, Paper Makers Chemical Dept., Hercules Powder Company (Holyoke, Mass.); and treasurer—Herman T. Barker, Bird & Son, Walpole, Massachusetts.

◆

▶▶▶ THE SEVENTH International Heating and Ventilating Exposition will be held at Lakeside Hall, Cleveland, Ohio, January 27 to 31, 1947. This will be the first exposition of its class since 1940. Over eighty per cent of the total exhibit area has been engaged.

◆

COMING EVENTS

Sept. 10-14—National Chemical Exposition, The Coliseum, Chicago.

Sept. 13-14—Fall meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association, at Mount Washington Hotel, Bretton Woods, New Hampshire.

Sept. 12-14—N. Y.-Can. Div. American Pulp and Paper Mill Superintendents Association, Sagmore Hotel, Bolton Landing on Lake George.

Sept. 16-20—First National Instrumentation Conference and Exhibit, Wm. Penn Hotel, Pittsburgh, Pa.

Sept. 26-28—Fall meeting of the Technical Association of the Pulp and Paper Industry, Statler Hotel, Detroit, Mich.

Oct. 2-4—TAPPI Engineering Conference, Hotel Pfister, Milwaukee, Wis.

Oct. 7—National Safety Congress, in Chicago. Headquarters and exhibits at Stevens Hotel. Meetings may be held in Stevens, Palmer House, and Congress Hotels.

Eliminate Down Time!

. . . ON SUPER CALENDERS, COATERS, AND IN ALL CONVERTING OPERATIONS

Down Time Means ⟩ Loss and Waste; Erratic Quality Control; Increased Cost Per Ton

YOU CAN'T AFFORD DOWN TIME IN POST-WAR COMPETITION

The Kohler System

of continuous unwinding and rewinding with full speed change of rolls

Eliminates Down Time!

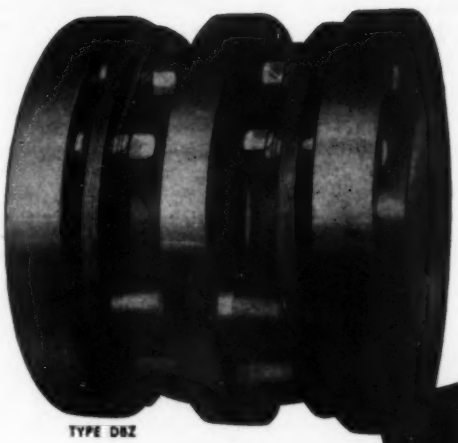
The Kohler System Company

159 East Chicago Avenue

Chicago 11, Illinois

THOMAS *Flexible* COUPLINGS

. . . proven to be 100% dependable on wood choppers, centrifugal pumps and other heavy duty machinery in the paper manufacturing industry



TYPE DBZ

Today's modern high-speed paper manufacturing machinery requires couplings with all the important features built into the couplings designed by Thomas Engineers.

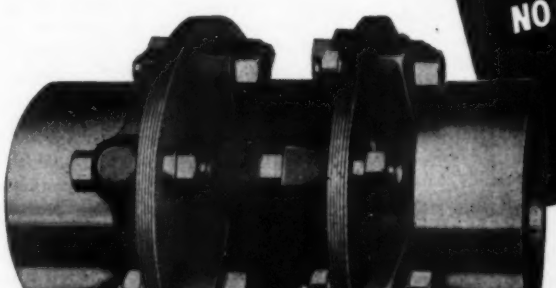
Thomas Couplings are in perfect balance under all conditions of misalignment.

BACKLASH, FRICTION, WEAR and CROSS-PULL ARE ELIMINATED

NO LUBRICATION IS REQUIRED!

Torsional characteristics remain constant regardless of length of service.

The Longer Life of Thomas Flexible Couplings, without costly interruptions and replacements will add much to Your Operating Profits!



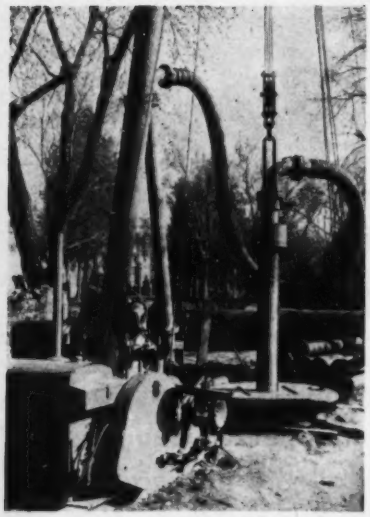
TYPE AM

Thomas All-Metal Flexible Couplings do not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

Write for our Complete Engineering Catalog!

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA



Builders of Modern

WELL WATER SYSTEMS

Layne Well Water Systems are absolutely modern in every detail—modern in the latest and most efficient engineering principles—modern in practical and economical design—and modern in rugged, long lasting construction. Furthermore, Layne Wells are drilled and completed by exclusive Layne developed methods which enable them to produce greater quantities of water per inch of casing diameter.

Each Layne Water System is installed, tested and turned over to the owner ready to operate. The buyer, therefore looks only to Layne for fulfillment of the contract.

Layne Well Water Systems have been the choice of cities, factories, refineries, railroads, irrigation projects, mines, etc., for nearly seventy years. Thousands are in use throughout the United States and in almost every foreign country on the globe.

For further facts, details, catalogs, bulletins, etc., address Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

HIGHEST EFFICIENCY

Layne Vertical Turbine pumps are available in sizes to produce from 40 to 16,000 gallons of water per minute. High efficiency saves hundreds of dollars on power cost per year.

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minn. * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

LOVEJOY TAKES OVER TRANSMISSION DEPT. OF IDEAL INDUSTRIES

The entire manufacture and sales of the mechanical power transmission department of Ideal Industries (Sycamore, Illinois) has been acquired by the Lovejoy Flexible Coupling Company, Chicago, Illinois.

The products that pass to the Lovejoy company are: Ideal variable steel pulleys, adjustable motor bases, "Select-O-Speed" transmissions, Ideal drive sheaves, and stock of wide V-belts. Deliveries will be available under the new ownership during July.

Both concerns are international in their coverage of the machine world. Lovejoy has a long history in the production of flexible shaft couplings for transmissions.

◆

▶▶▶ THE EXPANSION PROGRAM of the Detrex Corporation is being carried through. The new main plant of the organization which is located at 14331 Woodrow Wilson Avenue, Detroit, Michigan, and office facilities at this location widen the scope of the company's services. The former main plant located on Hillview Avenue (Detroit) is now being converted to the manufacture of equipment and market chemicals for the dry cleaning industry. Also, a new office and warehouse has been opened by Detrex in Grand Rapids, Michigan.

◆

FRANK GREENWALL SPEAKS BEFORE SENATE COMM. ON SERIOUS CORN SITUATION

Shortly after his return from an inspection tour of foreign factories of the National Starch Products, Incorporated, New York City, Frank Greenwall, company president, told of the serious consequences of the corn situation when he appeared before the Small Business Committee of the Senate.

Mr. Greenwall visited the Dutch and English factories of the company, and states he found both plants intact.

The Dutch factory processes potatoes into starch products principally for export. A satisfactory yield is expected to be produced in Holland, and the exportation restrictions are expected to be relaxed.

While in England, Mr. Greenwall conferred with officials of the food ministry concerning the world starch shortage.

◆

J. B. TROTMAN TO HEAD NEW BOWSER PUMP DIVISION

A new Bowser Incorporated, Industrial Pump Division to be located at Fort Wayne, Indiana, will be headed by J. B. Trotman. This new division of the Bowser company will manufacture a complete line of pumps for general industrial and petroleum applications.

Mr. Trotman has been identified with the pump industry for thirty years. For the past six years he has been general sales manager of the Blackmer Pump Company, Grand Rapids, Michigan.

◆

▶▶▶ THE BOSTON OFFICE of the H. K. Porter Company, Incorporated, has been moved from its location on Chauncy Street (Boston) to a new location at 294 Washington Street, Room 735, Boston 8, Massachusetts.

◆

▶▶▶ A SITE NEAR OTTAWA, Illinois, has been secured by Bakelite Corporation, a subsidiary of Union Carbide and Carbon Corporation, on which it will build a new plant for the manufacture of vinylite plastic film and sheets. The property formerly was owned by Inland Rubber Company. It is expected the new plant will be in operation by the first quarter of next year.

◆

▶▶▶ PLANT NO. 4, in Chicago, has been purchased from the War Assets Administration by Electric Storage Battery Company, Philadelphia. The Plant, which occupies 183,500 sq. ft. and is located at 5325 South Western Avenue, Chicago, was used by Foote Brothers Gear and Machine Corporation, Chicago, during the war.

HARRIS-SEYBOLD FORMS PACIFIC SALES DIVISION

Announcement was made recently that the Harris-Seybold Company, Cleveland, would install a Pacific Sales Division. The formation of the new sales branch follows the rapid growth of the West Coast and the need for increased services in that locality.

The Pacific Sales Division will be headed by William Guy Martin, who is vice president of Harris-Seybold and former western district manager. Mr. Martin will have his headquarters for the district in San Francisco.

◆

WESTINGHOUSE COURSE FOR EMPLOYEE IS AVAILABLE TO OTHER ORGANIZATIONS

Designed to give a clear and concise picture of the construction, operation, and selection of electrical instruments, the Westinghouse Electric Corporation, Pittsburgh, Pennsylvania, has prepared a course for its employees.

Primarily for use by the Westinghouse organization, the course has been made available to educational institutions, engineering societies, and engineering departments of all organizations using electrical measuring instruments.

Textbooks have been prepared as well as instructors' manuals, and the course is supplemented by sound films. Distribution will be handled by the Industrial Relations Department, Westinghouse Electric Corporation, 306 Fourth Avenue, Pittsburgh 30, Pennsylvania.

◆

▶▶▶ DURING THE HISTORY of the company, the month of May, 1946, was the largest for the production of electronic and industrial instruments for the Brown Instrument Company, Philadelphia, a division of the Minneapolis-Honeywell Regulator Company. The company reports that precision and recording instruments developed during the war are now being introduced for many new and improved methods of processing thousands of new products.

◆

BUREAU OF ORDNANCE U.S.N. HONORS STAFF & EMPLOYEES OF FOREST PRODUCTS LAB.

The Bureau of Ordnance, United States Navy, has awarded staff members and employees of the Forest Products Laboratory, Madison, Wisconsin, certificates in recognition of their wartime research in plastic, pulp, paper, wood, and other products. The certificates were signed by Rear Admiral G. F. Hussey and presented to the staff by Captain Jack E. Huff.

Those receiving the awards were: Carlisle P. Winslow, former laboratory director; L. J. Markwardt, assistant director; Parker K. Baird, Gardner H. Chidester, E. C. O. Erickson, Milburn Henig, George Mackin, John C. Pew, Sidney L. Swartz, Dr. Alfred Stamm, Rolf Thelen, T. R. C. Wilson, and Leslie A. Yolton.

A certificate was awarded posthumously to the late Dr. E. C. Sherrard, former chief of the division of derived products. Also, certificates were awarded to Dr. Horace K. Burr and Herbert R. Meyer who have resigned since the war.

◆

▶▶▶ COMPLETION OF a modern dry color plant has been announced by the Universal Pigment and Chemical Corporation, Newark, New Jersey. The new plant has the most up-to-date production facilities and contains research and control laboratories for the solution of color problems. The company was organized the first of the year. It is planned to manufacture a complete line of organic lakes and toners for use in the paint, printing ink, and other allied industries.

◆

SAFETY CONTEST SCORES

▶▶▶ THE ELEVENTH MONTH of the Paper Industry Safety Contest for 1945-6 brought returns showing nine contestants holding perfect scores.

The contest closed on June 30, and the National Safety Council already has launched the next contest to run for twelve months through June, 1947. Perfect scores for May are as follows:

Division I—Pulp and Paper Mills

Group A—None.

Group B

Kimberly-Clark Corp., Niagara, Wis.

The Flintkote Co., Meridian, Miss.

Group C

Price Bros. & Co., Ltd., Jonquiere Mill, Quebec, Can.

Group D

E. I. duPont de Nemours & Co., Inc. (Russell Plant).

Strathmore Paper Co. (Woronoco Mill No. 1), West Springfield, Mass.

Division II—Paper & Board Remanufacturing

Group A—None.

Group B

Fort Wayne Corrugated Paper Co., Chicago.*

Bird & Son, Inc. (Roofing Plant), Shreveport, La.

The Flintkote Co. (Hollywood Paper Box Div.), Los Angeles, Cal.

Bay West Paper Co., Green Bay, Wis.

*May report missing.

80%

OF ALL CHEMICAL PULP MADE ON THIS CONTINENT IS PROCESSED AT SOME STAGE OF ITS MANUFACTURE IN EQUIPMENT BUILT OR LINED BY STEBBINS.

Let us demonstrate the superiority of Stebbins lining and tile tank service the next time you line a new vessel or reline an old one.

Stebbins Engineering and Manufacturing Company

EASTERN BOULEVARD, WATERTOWN, NEW YORK

NAMES in the News

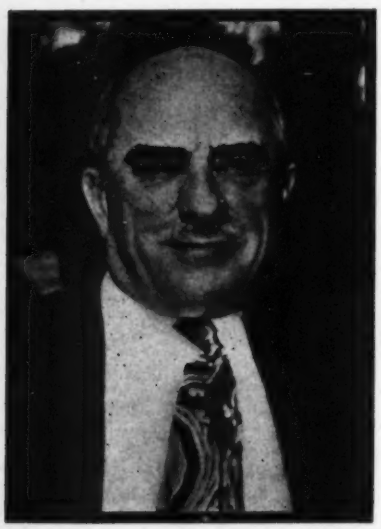
Douglas Nelson Clark Smith Cleveland White Spaulding Arthur Wolf Morris Simpson Kraft Bryan Temple

PERSONALS

PETER J. MASSEY RETIRES

On June 30, Peter J. Massey retired as vice president of the H. P. Smith Paper Company, Chicago. He had been connected with that organization since 1940. Mr. Massey will continue to serve on the board of directors of the company and will be available in an advisory capacity.

During the absence of the company's president, C. Carr Sherman, who served with the Armed Forces, Mr. Massey acted as general manager. While he was in charge of all activities of the company, many new items were developed and the company's business expanded several times.



Peter J. Massey

In addition to his work with the Smith organization, Mr. Massey was a consultant at the Quartermaster Corps Subsistence and Research Laboratory; he served on the Ordnance Wrap Committee, the Bearing Wrapping Committee of the S.A.E., and did considerable research and development in devising corrosion and greaseproof tests for bearing wraps. He also served on the War Production Board and the Office of Price Administration Industry Advisory Committees, and was chairman of the Industrial Relations Committee of the Waxed Paper Institute.

◆

GEO. HARDISTY TO HEAD NEW RESEACH DIVISION ESTABLISHED BY MANDO

A new division of the Research Department of the Minnesota and Ontario Paper Company to be known as the commercial research department has been organized. George Hardisty, who has been treasurer of the company for several years, has been appointed manager of commercial research. Mr. Hardisty will make his headquarters in Minneapolis.

George Hardisty

Returning from two years service with the Armed Forces, Edgar A. Lauring will resume his duties with the research department. Mr. Lauring will be located at the Mando research laboratory, International Falls, Minnesota.

CONTAINER CORP. MOVES PAEPCKE TO NEW OFFICE— CHAIRMAN OF THE BOARD

Organizational changes recently announced by Container Corporation of America, Chicago, include the elevation of Walter P. Paepcke from the presidency to the newly created office of chairman of the board and chief executive officer of the company.

Walter P. Paepcke

Wesley M. Dixon, vice president, has been elected to the office of president. The former divisional responsibilities of Mr. Dixon have been divided between two of the corporation's vice presidents: J. V. Spachner and I. C. Keller, in addition to their present divisional management.

◆

▸▸▸ The Strathmore Paper Company, West Springfield, Massachusetts, has announced the appointment of *Robert J. Clark, Jr.*, to the position of advertising manager. Mr. Clark succeeds *Harry E. Riggs* who has been promoted to the post of sales manager. During the war, Mr. Clark served with the public relations section of the Ordnance Department; later, he acted as chief of the War Department bureau of public relations. For his service he was awarded the Legion of Merit medal. Prior to the war, Mr. Clark was assistant advertising manager of the Old Colony Envelope Company.

◆

▸▸▸ Following the resignation of Theodore J. Gross from the Container Testing Laboratories (New York, Chicago, and San Francisco), the following organization adjustments were made: *Charles J. Zusi*, vice president, will be in charge of shipping container methods at all three laboratories and

See WHAT WATER CAN DO TO PAPER PROFITS!

TAKE WHITE WATER—Those pulp fibres it contains are valuable . . . far too valuable to waste. Indeed, to many a paper mill the water itself is precious, and must be recycled again and again.

The White Water Reclaimer, designed for the paper industry by Permutit,* not only recovers a high percentage of fibre and filler from this "waste" water, but permits re-use of the water.

TAKE PAPER QUALITY—Impurities in process water can mar the quality of your paper product . . . may mean rejects, with loss of profit and goodwill. Permutit Water Conditioning *removes* dirt, iron and other impurities from the water supply . . . gives you a cleaner, brighter sheet.

If you have a water problem, there's no better time to get after it than now, and no better way than Permutit Water Treatment. Modern, economical Permutit equipment gives the paper mill *complete control* of water quality.

Write for information to The Permutit Company, Dept. PI7, 330 West 42nd Street, New York 18, N. Y. or Permutit Co. of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

PERMUTIT

WATER CONDITIONING HEADQUAR

will manage the Chicago branch. *Arthur C. Gault* will be in charge of the quality control program sponsored by the Laboratories with the fiber box manufacturers. *Alfred W. Hoffman* has been appointed manager of the New York laboratory. *G. A. Pitman,* vice president, will remain in charge of the San Francisco laboratory.

◆

DR. J. H. MOORE NOW IN CHARGE FIBER RESEARCH RAILWAY SUPPLY & MFG. CO.

The appointment of Dr. Jerry H. Moore as director of its fiber research department is announced by the Railway Supply and Manufacturing Company, Cincinnati, Ohio.

As cotton technologist with the North Carolina State Agricultural Experimental Station since 1927, Dr. Moore has specialized in the development of fiber qualities and staples to give the best results in spinning.

The Railway Supply and Manufacturing Company specializes in the grading, marketing, and processing of cotton and synthetic fibers.

◆

▶▶▶ Touring St. Regis licensees and affiliates in England, Holland, Switzerland, France, and Italy, *Willard E. Hahn,* general manager of bag production, and *Edward E. Burroughs,* director of bag engineering, will work for a closer co-ordination of American and European multiwall paper bag manufacture and technique.

◆

▶▶▶ Sales representative for the Electric Machinery Manufacturing Company, Minneapolis, Minnesota, in the North and South Carolina territory will be *Russell Ranson.*

Russell Ranson

D. S. DAVIS TO HEAD EDITORIAL DIVISION OF GOVERNMENT LABS.

The former mathematician for the Wyandotte Chemical Corporation, D. S. Davis, is now in charge of the Editorial Division of the Government Laboratories, Akron, Ohio. The laboratories are managed by the University of Akron, Agent for the Reconstruction Finance Corporation, Office of Rubber Reserve.

D. S. Davis

Mr. Davis has produced the nomographic charts which have been a feature of THE PAPER INDUSTRY AND PAPER WORLD for twenty years.

◆

▶▶▶ The new managing director of Shipping Container Institute will be *Theodore J. Gross.* Mr. Gross has been president of the Container Testing Laboratories, of New York and Chicago, and has been affiliated with the Laboratories for twelve years. He is a qualified authority in the field of packing. Mr. Gross is an active member of the Technical Association of the Pulp and Paper Industry and the American Society for Testing Materials.

◆

MacCUTCHEON RETIRES FROM RELIANCE ELECTRIC

Senior vice president of the Reliance Electric and Engineering Company, Cleveland, Ohio, A. M. MacCutcheon retired July 1. Mr. MacCutcheon will devote his full time to certain special projects of his own, but he will remain available to the company as a consultant.

Mr. MacCutcheon joined Reliance in 1914 to design a new line of adjustable speed d-c motors. During his long service with the company he has been chief engineer, and engineering vice president. He has taken a prominent part in association work in the electrical industry field having served as president of the American Institute of Electrical Engineers.

◆

STEVENS TECH. DIR. OVER ALL NAT'L CONTAINER MILLS

Following the recent acquisition of control of Tomahawk Kraft Paper Company (Tomahawk, Wis.) by National Container Corporation, Jacksonville, Florida, announcement was made that R. H. Stevens would be technical director of National Container and its subsidiaries.

Mr. Stevens has been chief chemist for National Container Corporation, Jacksonville (Fla.). His new work will include the affiliated companies, Bedford Pulp & Paper Company, Big Island, Virginia; the Ontonagon Fiber Corporation, Ontonagon, Michigan; and the newly acquired Tomahawk Kraft Paper Company.

Succeeding Mr. Stevens as chief chemist of National Container's Kraft Pulp and Board Division at Jacksonville is Karl M. Guest.

◆

▶▶▶ A change in address is announced by *Dr. P. R. Sanborn,* formerly of Geneva, New York. Mr. Sanborn is now located at the Division of Bacteriology, Department of Plant Science, Syracuse University, Syracuse 10, New York. Formerly, he was in charge of paper sanitation research at the New York State Agricultural Experiment Station, Geneva.

◆

KIMBERLY-CLARK ANNOUNCES SALES PERSONNEL CHANGES

The appointment of D. H. Keck as district representative of Kimberly-Clark Corporation was announced July 2. Mr. Keck will be in charge of all sales at the corporation's middlewest headquarters in Chicago.

Other changes now effective include the appointment of S. B. Fithian to succeed Mr. Keck as district manager of paper sales, and the appointment of E. T. Hittson, Jr., to replace Mr. Fithian as assistant district manager of paper sales.

◆

ERNEST ROSSITER NEW PRES. SOUTHERN PAPERBOARD CORP.

The presidency of the Southern Paperboard Corporation, Savanah, Georgia, has passed from George E. Dyke, who becomes chairman of the board, to Ernest Rossiter, former president of the St. Lawrence Corporation. Montreal, Canada.

ONE *recognized standard*

THE COTTRELL PROCESS OF ELECTRICAL PRECIPITATION

FOR GAS CLEANING, smoke abatement and removal of dust, fume, tar and other suspended matter from gas, there has been one universally accepted process for more than thirty years. In answer to your special problem, a Cottrell installation incorporating this rich experience in research, development and worldwide operation means the complete fulfillment of your requirements.

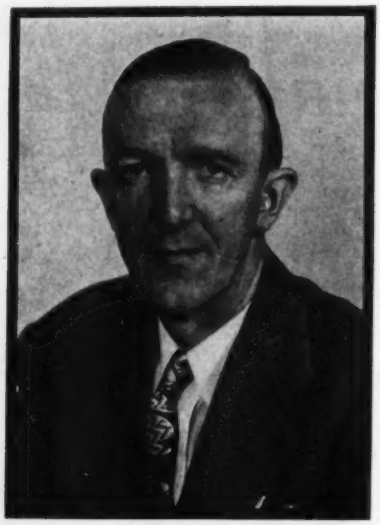
RESEARCH CORPORATION

NEW YORK 17: 405 LEXINGTON AVENUE
CHICAGO 3: 122 SO. MICHIGAN AVENUE

The Southern Paperboard Corporation is a new subsidiary of Robert Gair Company, Incorporated, which was organized last year. Plans have been announced for a $9,000,000 sulphate pulp and paperboard mill (Cf. P.I. and P.W. April, 1946.)

◆

▶▶▶ At a meeting of the board of directors of the Minnesota and Ontario Paper Company held at International Falls, Minnesota, June 24, *Carl O. Holmer* was elected assistant treasurer



Carl O. Holmer

of the company. Mr. Holmer is a native of Minneapolis and has been associated with Mando for the past twenty years.

◆

▶▶▶ A member of the Kimberly-Clark Corporation, *Fred Bentzen* has been named chairman of the Twin City Safety Council, Neenah-Menasha, Wisconsin. As chairman, he succeeds *Howard Aderhold*, of the Marathon Corporation.

◆

▶▶▶ The retirement of *A. E. Ashcraft*, for many years vice president in charge of manufacturing for the Fairbanks-Morse and Company, Chicago, Illinois, has been announced. Mr. Ashcraft will continue as a director of the company. *C. H. Morse III*, a vice president of the company, has been placed in charge of all manufacturing.

◆

▶▶▶ The new director of sales for the Diamond Alkali Company, Pittsburgh, Pennsylvania, is *W. H. McConnell*. Also serving in a new post is *J. D. Mattern*, who is assistant director of sales.

TUCKER APPOINTED TO SUCCEED THE LATE E. O. REED AT CRANE COMPANY

To fill the vacancy caused by the passing of Edward O. Reed, Crane & Company, Inc., Dalton, Massachusetts, announces the appointment of L. B. Tucker to the position of technical director.

Mr. Tucker has been assistant to the late Mr. Reed since 1929 at which time they both became associated with Crane & Company. The new direector attended New York State College of Forestry at Syracuse University, where he took the course offered by that school in pulp and paper manufacture. Following his graduation, he worked for a year in Washington under the late Mr. Reed, who was then technical director of the Government Printing Office.

◆

▶▶▶ The appointment of *F. J. Hoar* to the position of vice president and general manager of the G. D. Jenssen Company, Incorporated, Watertown, New York, has been announced.

◆

NICHOLSON NOW PRESIDENT HOLLINGSWORTH AND VOSE

At its annual meeting the week of June 28, Hollingsworth and Vose Company, East Walpole, Massachusetts, Aubrey K. Nicholson, vice president of the company, was advanced to the presidency.

Robert W. Lennox, formerly treasurer, was made vice president, and Bruce G. Lennox was elected treasurer.

◆

▶▶▶ The post of production control manager of the Brown Instrument Company, Philadelphia, has been given to *J. W. Weingartner*. For the past 22 years, Mr. Weingartner has been with Brown Instrument (industrial division of Minneapolis - Honeywell Regulator Company). He also will direct purchasing. Charles Goodman has taken over the duties of purchasing agent under Mr. Weingartner's supervision, and William Lawson has been named assistant production control manager.

◆

▶▶▶ New members of the Controllers Institute of America are: *Paul A. Wilks*, controller of the Strathmore Paper Company of West Springfield, Massachusetts, and *Raymond A. Terry*, chief accountant for the Sonoco Products Company of Hatsville, South Carolina. The Institute is a technical and professional organization of controllers devoted to improvement of controllership procedure.

▶▶▶ The former works manager of the American Manganese Steel Division of the American Brake Shoe Company at New Castle, Delaware, *W. Frank Kelly*, has been promoted to the

W. Frank Kelly

post of general superintendent of foundries for Amsco. Mr. Kelly will make his headquarters in Chicago Heights.

◆

▶▶▶ All tax problems, accounting affairs, and other related matters of the Timken Roller Bearing Company (Canton, Ohio) will now be under the supervision of *Richard C. Baker*. Before assuming the position of executive assistant with Timken, Mr. Baker was associated with the Canton office of Ernst and Ernst, a nationally-known firm of public accountants.

◆

▶▶▶ The president of the Cream of Wheat Corporation, *Daniel F. Bull* has been elected to the board of directors of the Minnesota and Ontario Paper Company, Minneapolis.

◆

▶▶▶ The appointment of *John C. Morris* as superintendent of manufacturing of the Resin and Insulation Materials Divisions of the General Electric Chemical Department, Pittsfield, Massachusetts, has been announced. Mr. Morris has served as assistant superintendent for the past year.

◆

▶▶▶ Formerly associated with The Lithium Company, Newark, New Jersey, *R. W. Mason, Jr.*, has joined the Development and Research Division of The International Nickel Company, Inc. He will make his headquarters at the Detroit Technical Section of the Division.

To get *more* for your valve dollar consult POWELL Engineering

No one would expect a burro to pull a load that requires a heavyweight draft horse. But a sure-footed burro is just right for carrying a pack on a mountain trail where the power of a draft horse would be wasted.

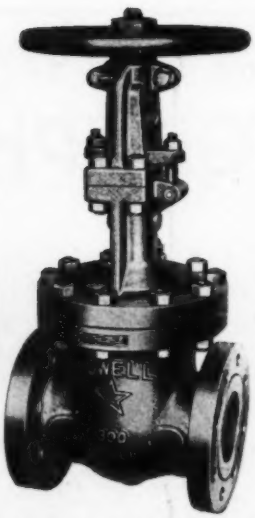
And yet when it comes to valves, such "misapplication" is often encountered. *Many cases of failure are directly due to expecting service from a valve which it was not designed to give.* Consequent replacements are costly. On the other hand, it is not sound economy to use a valve of more expensive construction than the particular service requires. The Powell Line* of Bronze, Iron, Cast Steel and Corrosion Resistant Valves, is so *complete* that there's a POWELL Valve that's *just right* for every flow control condition encountered in modern industry. When you need valves for new installations or for replacements, don't risk "misapplication". Consult POWELL Engineering and *get more for your valve dollar.*

The Wm. Powell Company, Cincinnati 22, Ohio

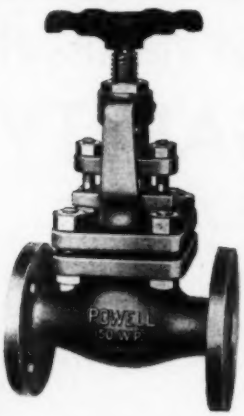
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

*In writing for catalogs kindly specify the service conditions under which the valves, in which you are interested, must operate.

Large Iron Body Bronze Mounted Gate Valve for 125 pounds W. S. P. Made in sizes 2" to 30", incl. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Taper wedge double discs can be provided in sizes 2" to 12", incl. Seat rings and stem are bronze. Disc is bronze in 3½" and smaller size valves and bronze faced in the larger sizes. Also available in All Iron for certain services.

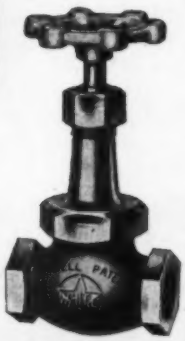


Class 300-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Powell Cast Steel Valves of all types are available in pressure classes from 150 to 2500 pounds, inclusive.



Small Bronze Globe Valve for 200 pounds W.S.P. Made in sizes ¼" to 3", incl. Has screwed ends, union bonnet, renewable, specially heat-treated stainless steel seat and regrindable, renewable, wear - resisting "Powellium" nickel-bronze disc. A long-life valve, designed to stand up under severe service conditions.

Stainless Steel Gate Valve for 150 pounds W. P. Has flanged ends, outside screw rising stem, bolted flanged yoke - bonnet and taper wedge solid disc. This is one of many special Powell designs for handling corrosive media. Available in a wide range of corrosion resistant materials.



Small Bronze Globe Valve for 150 pounds W. S. P. Made in sizes ¼" to 3", incl. Has screwed ends and union bonnet. Regularly furnished with renewable vulcanized composition disc for steam service, but special discs are available for other services.

POWELL VALVES

NECROLOGY

EDWARD O. REED

Technical director of Crane & Company, Dalton, Massachusetts, since 1929, Edward O. Reed passed away on June 23. He was 62 years of age.

Mr. Reed was graduated from George Washington University. He was first employed by the Department of Agriculture, Bureau of Chemistry, in 1908 and remained there until 1922. From that time until 1927, he was chief of tests for the Government Printing Office and the following two years he served that office as technical director. Under his expert supervision, standard specifications of quality were highly developed for the benefit of the printing, book-binding, and allied industries.

Under Mr. Reed's direction, the technical section of Crane & Company was expanded from a small laboratory to one of the mills to a comparatively large organization consisting of a main laboratory where research and control work is carried on, as well as smaller branch laboratories in each of the Crane mills.

Mr. Reed was the author of numerous articles on paper testing, manufacturing and development. He had been active in TAPPI and for three years he served as chairman of the testing division. For three more years he was on the Association's executive committee, and at the time of his passing, he was a member of the standards committee.

Surviving are the widow, a daughter and a son.

◆

HAROLD E. WALKER

For the past twelve years production manager in charge of paper-mill, board-mill and pulp-machine operations of the Canton (N.C.) Division of the Champion Paper and Fibre Company, Harold E. Walker passed away June 28 in Asheville, North Carolina. He was 63 years of age.

A papermaker for 45 years, Mr. Walker was well known in the industry. Prior to joining Champion, he was vice president of the old Reading Paper Mills and had served in supervisory capacities in the mills of the Eastern Corporation, the Jessup & Moore Paper Company, the Chemical Paper Manufacturing Company, the American Writing Paper Corporation, as well as several other mills in the Holyoke area.

Mr. Walker was a member of the Southeastern Division of the American Pulp and Paper Mill Superintendents Association, and he was one of the early members of the Technical Association of the Pulp and Paper Industry.

Surviving are the widow, a daughter, and a son.

◆

▶▶▶ Retired from the presidency of the Franklin Paper Company, Holyoke, Massachusetts, *Robert Alexander Ramage* passed away June 8. He was 67 years old. The family name had been prominently identified with the paper industry for generations.

◆

▶▶▶ Managing director of Safety Research Institute, Inc., *Leroy W. Hutchins*, passed away June 21 at the age of 57. Burial was at Royal Oak, Michigan, his birthplace. Mr. Hutchins was well known in public relations and advertising circles. He was president of Sheldon, Morse, Hutchins and Easton, Inc., of New York, a public relations firm he helped to found in 1931. He also was president of Hutchins & Graves, Inc., advertising agency.

New! a visual aid allowing group participation!

IT'S THE SAFETYGRAPH

What news! A visual aid that's ready for action all the time. No special costly equipment, nothing to do but set up the easel, turn the pages, and give the convincing, fast-moving safety talk printed on the back of each page.

What a subject! Safetygraph No. 1 is devoted entirely to "HOW TO LIFT." Every phase of lifting and handling objects is thoroughly covered.

What an idea! The 18 x 24-inch Safetygraph has 16 instructive pages of attention-getting photographs and cartoons emphasizing lifting do's and don't.

What a feature! Permits group participation in on-the-spot discussions. Workers can ask questions, offer suggestions, and tell their accident experiences without fear of disrupting the meeting. Next time you hold a safety meeting, make it a Safetygraph Meeting!

Write today! For complete details and prices address: Dept. DW-1.

Spiral Bound Pages Turn Easily—Lay Flat

NATIONAL SAFETY COUNCIL, Inc.

20 North Wacker Drive — Chicago 6, Illinois

Some paper manufacturers are like the Red Queen in the story book—in their efforts to increase tonnage they run the machines at top speed but they lose more time by stops for adjustment of the felts than they gain by speeding up the wires.

The purpose of the wire clothing is to deposit the fibers uniformly from deckle to deckle. The felt must remove the water, full width of the sheet, as fast and as uniformly as the wire does its work. Otherwise the direct heat needed at the drier rolls must be increased to the danger point.

One of many reasons why experienced paper manufacturers prefer Hamilton Felts is because Hamilton Felts do their work uniformly and fast. When the sheet leaves a Hamilton Felt there are no wet spots left, to be ironed out—less heat is needed—cost of fuel is reduced. Hamilton Felts run *true* at all speeds—seldom require adjustment—reduce broke—increase tonnage.

From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

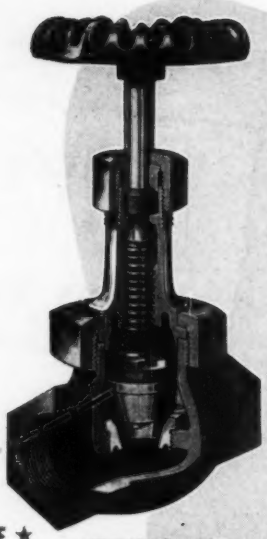
SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

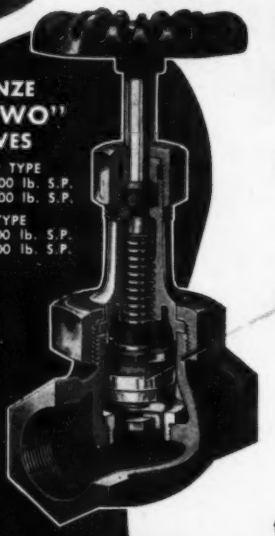
Here's all you need... to convert a regular type into a plug type valve...

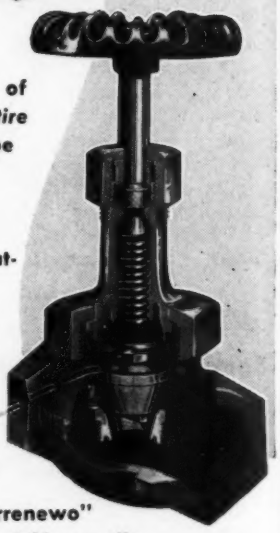


BRONZE "RENEWO" VALVES

REGULAR TYPE
Fig. 73 . . . 200 lb. S.P.
Fig. 16 . . . 300 lb. S.P.

PLUG TYPE
Fig. 73-P . 200 lb. S.P.
Fig. 16-P . 300 lb. S.P.

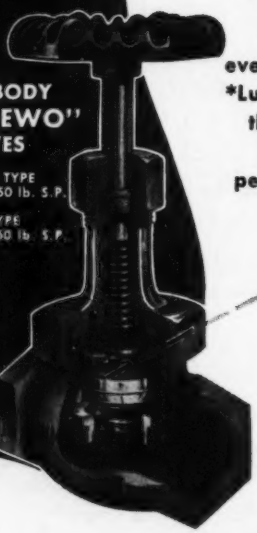




IRON BODY "FERRENEWO" VALVES

REGULAR TYPE
Fig. 1021 . . . 150 lb. S.P.

PLUG TYPE
Fig. 1021-P 150 lb. S.P.

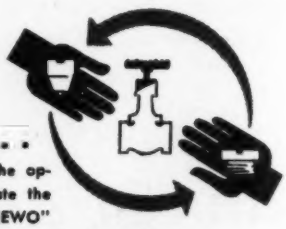


SEATS AND DISCS INTERCHANGEABLE ★

Just insert a plug type seat and disc in place of the regular type, and you change an *entire* Bronze "Renewo" Valve from regular to plug type —providing all the extra advantages of this type, including its ability to stand up under unusually hard service. No other change is necessary. The plug type seat-and-disc combination is made to *fit perfectly* into a regular type valve of corresponding size and pattern. And you have this same interchangeability in Iron Body "Ferrenewo" Valves. You don't have to buy an entire new valve . . . you don't even have to take the valve out of the line.

*Lunkenheimer interchangeability goes still farther. *All parts* of 200 lb. "Renewo" and 150 lb. "Ferrenewo" Valves (except bodies and bonnet rings) are quickly, easily, perfectly interchangeable. Fewer parts are needed; ordering and handling are simplified; repairs are facilitated. You save time, labor, money.

Write for a copy of Circular 567—

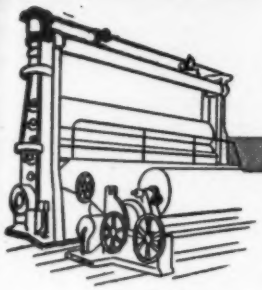


LET YOUR LUNKENHEIMER DISTRIBUTOR DEMONSTRATE . .

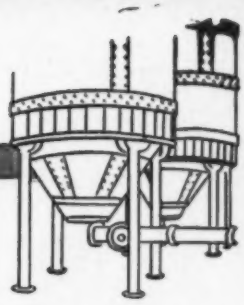
Your nearby Lunkenheimer Distributor will welcome the opportunity to show you actual samples and demonstrate the interchangeability of parts in "RENEWO" and "FERRENEWO" Valves. You'll find it a big factor in increasing efficiency, lowering costs.

THE LUNKENHEIMER COMPANY

CINCINNATI 14, OHIO, U. S. A.
NEW YORK 13, CHICAGO 6, BOSTON 10, PHILADELPHIA 7.
EXPORT DEPARTMENT: 319-322 HUDSON ST., NEW YORK 13, N. Y.



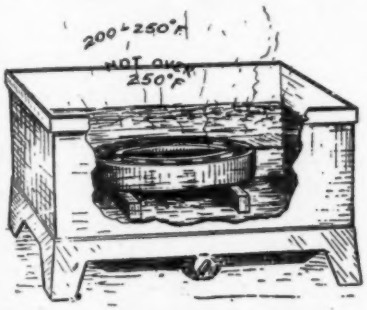
Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

The Know-How for Installing A Large Anti-Friction Bearing

The inner rings of large bearings are generally shrunk on shafts. This is a very simple operation consisting of heating the bearing or inner ring in clean oil or temperature controlled oven to a temperature of between 200 and 250 Fahr. This



Support bearings on blocks, well away from bottom. Don't keep bearings in hot oil or oven after correct temperature is reached

expands the inner ring sufficiently so it should slip over the shaft to the bearing seat. *Don't overheat the bearing or it will lose its hardness.*

If expanding the ring is not enough to get it on, freeze the shaft in dry ice to make it shrink smaller.—ANTI-FRICTION BEARING MANUFACTURERS ASSOCIATION, INC.

◆

Welding or Cutting of Tanks or Pipe Lines with Gas Equipment

Special precautions must be observed before welding or cutting work may be performed on small or large tanks or pipe lines.

1. Make certain that all tanks or pipe lines are vented while welding or cutting.

2. If the pressure vessel or pipe line has contained air or compressed gases the pressure must be fully released. If it contained gases, these must be purged out thoroughly by use of inert gas or water after which the vessel may be filled with air, or preferably with inert gas if the operator is not required to enter the vessel.

3. If the vessel has contained air or gases, it should be examined. If found to contain combustible residues such as oil, tar, etc., these must be removed by steaming or washing with sodium phosphate or caustic soda solutions.

4. If the vessel or pipe line has previously contained combustible liquids such as oil, gasoline, paint, lacquer, etc., they must be cleaned out by the use of proper cleaning solutions.

5. When it is necessary for the operator to perform welding or cutting work in a confined space or inside a closed vessel, he must be provided with special harness with life line and an assistant operator who will be located outside of the vessel to shut off cylinder valves or to render other assistance which may be necessary in case of emergency.

6. While working in confined space the operator must keep the fuel gas valve in the torch closed at all times except when the torch is lighted.

7. Ventilation shall be provided for the operator working in a confined space which will insure an adequate supply of fresh air. Air may be supplied by using a fan or blower and should be arranged in such manner as to carry fumes and smoke from the operator, or an air line respirator provided with air supplied by hand or motor-driven pump may also be used.—*Safety for Gas Welding, Cutting, and Brazing Operators.*—GENERAL ELECTRIC CO.

◆

How To Calculate Liquid Flow From Horizontal Pipe

The quantity of water or any other liquid flowing from a horizontal pipe, as shown in the accompanying sketch, can be computed with surprising accuracy by simply measuring the horizontal distance X and the vertical distance Y to any convenient point P is indicated by the dimension lines.

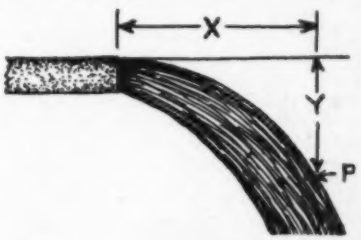
This is possible because of the well-known law of physics which tells us that a horizontally projected body falls vertically from a state of rest.

I shall not go through the derivation of the following rule, but it will enable you to determine the quantity of water or other liquid flowing from a horizontal pipe. The italicized wording is the rule. The wording that is not underscored shows how the rule is applied.

Rule: *Measure the internal diameter of the pipe in inches, and "square it."* Thus, if the internal diameter is 2 inches you will have 2 × 2 equals 4. *Then multiply by the distance X in inches.* Thus, if distance equals 80. *Then multiply that by 2.56.* Which gives us 80 X 2.56 equals 204.8 *Lastly, divide that by the "square root" of the distance Y.* Thus, if the distance X is 20 inches, you will have 4 × 20 Dividing 204.8 by 5 we get 40.96 gallons per minute, which is the answer.

Please note that all measurements are in inches and not in feet, and the answer is always in gallons per minute.

A short cut that will make your work easy is to choose a point P that is down a distance 9 inches, 16 inches, 25 inches, 36 inches, etc., because their square roots are exactly 3, 4, 5 and 6 respectively. In that way, it will not be necessary for you



to refer to tables of square roots or to arduously extract a square root by "long-hand."

In the event that you might want to convert the answer into cubic feet per minute, divide the above answer by 7.5 as there are approximately 7.5 gallons in a cubic foot.—W. F. SCHAPHORST.

◆

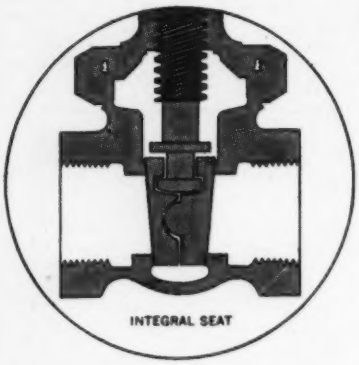
Difference Between an Integral Seat and a Renewable Seat Valve

The *integral* seat is machined directly in the metal which forms part of the casting of the valve body itself. The *renewable* seat is a removable seat ring which is screwed into place in the valve body. The advantages of each are as follows:

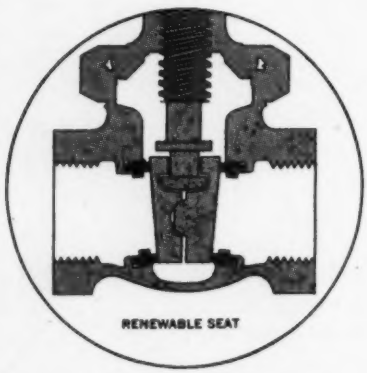
Integral Seat. Obviously it is far easier and less expensive to make valves with integral seats. Therein lies the chief advantage of this type. However, the life of a valve with integral seats is limited by the life of the seats. The bronze used in casting valve bodies is a relatively soft, ductile, yet tough material. Therefore, the face of an integral seat offers limited resistance to the wear caused by friction from the disc, erosive media, etc. Naturally, this type of seat cannot be replaced. Also, the number of times it can be *refaced* is strictly limited by the amount of metal it is necessary to remove in order to restore the face to first-class operating condition. Moreover, due to the softness of the metal, the wear is apt to be deep. In this event, after a few refacings there will be insufficient metal left to provide a seat and the life of the valve is ended. However, because valves with integral seats

are less expensive and are quite satisfactory as long as the seat can be refaced, this type is widely used.

Renewable Seat. This type has two all-important advantages. First, the seat rings can be made from hard, wear-resisting materials, or can be furnished with hard



facings. Second, when the seat rings can no longer be refaced, they can be replaced with a new seat ring. By also making the disc of hard materials, the life of the valve is immeasurably lengthened; and although it is a considerably more expensive construction, it is economical in the long run.



It may be well to note here that integral seats *must* be, and renewable seats *should* be refaced in the valve. Moreover, after screwing a new renewable seat ring into place the face should be lapped, as the operation of screwing in the seat ring may cause a distortion of seat face which, though imperceptible, will cause the valve to leak.—THE WM. POWELL CO.

◆

Freshening Charge in Storage Batteries

All batteries when standing idle lose charge. The amount lost will depend upon the type of battery, the length of the period of stand and the temperature of the battery during this period.

It is good practice to give the battery a freshening charge after it is installed. The normal finishing charge rate should be used and the charge continued until four hourly readings indicate no increase in corrected specific gravity. If the battery has stood more than 9 months without a charge, increase the time interval between specific gravity readings to 1½ hours. The fully charged specific gravity will be found indicated on the nameplate of the battery.—*Philco Storage Batteries*, PHILCO CORPORATION.

◆

Some General Precautions in Gas Welding or Cutting Work

1. Avoid mixing gases in any of your equipment except the torch.

2. Never use cylinders as rollers or supports even though they are empty. To do so may damage the cylinders and cause a serious accident.

3. Do not use oxygen as a substitute for compressed air on pneumatic tools, preheating burners, or for blowing out pipe lines, dusting clothing or testing pipe lines and tanks.

4. Do not permit a torch flame to come in contact with a cylinder. Do not permit a welding electrode to strike an arc on a cylinder. To do so causes the cylinder to be heated and the cylinder pressure to rise and may cause it to explode.

5. Do not use a cylinder which is damaged or shows evidence of having been in a fire.

6. Do not use equipment which is faulty in any respect. Call it to the attention of your foreman who will have it repaired for you.

7. Inspect your equipment at least once each week.

8. Do not attempt to repair, alter or experiment with your equipment in any way.

9. Do not use more pressure than is needed. To do so is both wasteful and hazardous.

10. Never screw the adjusting screw on a regulator as far as it will go as this prevents normal operation of the regulating mechanism. This will permit any fluctuation in line or cylinder pressure to affect the torch flame. More serious still, it will permit the gas which is at the higher pressure to flow back into the line at the lower pressure and sooner or later will cause a serious flashback or explosion.

11. Don't try to show how strong you are when closing cylinder valves. Close them only snug tight.

12. When speaking of gases, call them by their correct name. Such as *Oxygen*, and *Acetylene*; not Air or Gas.

13. Do not coil the hose about the shoulder or body while working.

14. Be careful to see that your clothing does not become saturated with oxygen or fuel gases.

15. Do not cut material in such a manner that the severed section will fall on you.

16. Protect yourself and all of your equipment against sparks and molten slag.

17. Never lay work that is to be heated or welded on a concrete floor. When the concrete becomes hot, the heated portion expands and flies out with considerable force.

18. Approved goggles must be worn at all times when using a torch.

19. Special clothing such as heat-resisting gloves, aprons, leg guards, and helmets are available, and should be used on large hot jobs to provide comfort and safety for the operator.

20. Noncombustible screens, arranged in front of the workman's legs, are suggested as protection against sparks and molten metal in cutting operations.

21. Wool clothing is recommended because it is not easily ignited and protects the workman from changes in temperature.

22. Clothing should be as plain as possible. Pockets should be eliminated in the front of overalls, shirts, and aprons. Sleeves and collars should be kept buttoned. Rolled-up shirt sleeves or cuffs on overalls or trousers should be avoided. Low shoes with unprotected tops are undesirable.—*Safety For Gas Welding, Cutting, and Brazing Operators*, GENERAL ELECTRIC CO.

◆

Safety Rules for Crane Operators

No one but an authorized person shall enter the crane cab.

Be sure no one is in, or about the crane before starting.

The operator shall recognize signals only from the person supervising the lift, or an authorized signal man.

If a warning signal is furnished, it shall be sounded each time before traveling, and when load approaches near or over workmen.

The proper party shall be notified of the need for adjustments and repairs as soon as it becomes known.

Chains and ropes used for handling the load must be straight and free from twists and kinks. Knots shall not be used to shorten chain or rope.

The operator shall make sure, either by personal observation or from signals, that the load is well secured and balanced before it is lifted more than a few inches off the floor.

Sudden starts and stops shall never be used.

Operators shall not hoist while anyone is riding on the load.

When handling heavy loads, stability and strength shall be checked by hoisting the load a few inches and holding it off the ground with the brake.

Slewing speed shall be controlled so that the load does not swing out beyond the radius at which it can be handled safely.

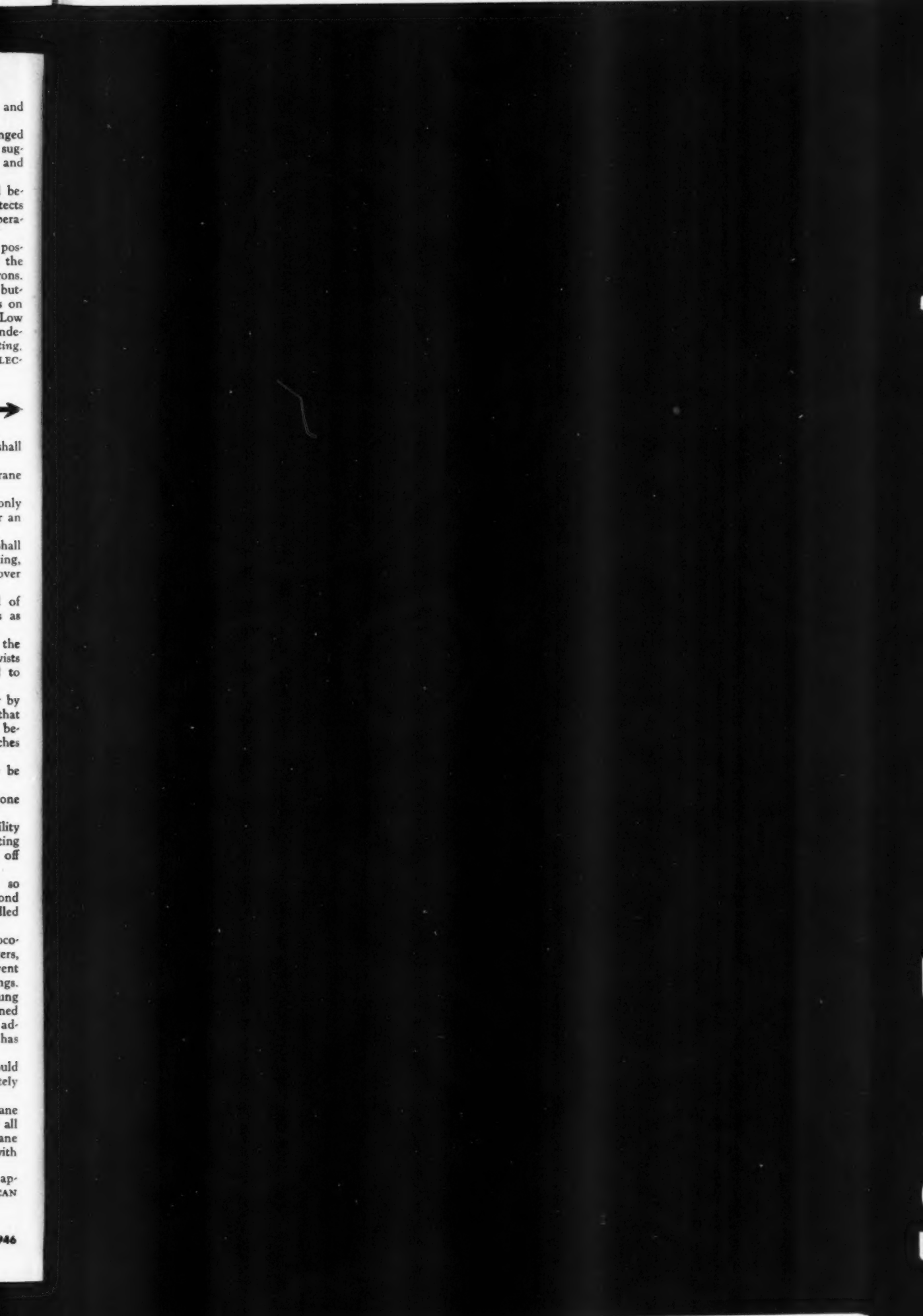
Before lifting loads with 8-wheel locomotive cranes without using outriggers, truck wedge cams must be set to prevent the load being carried on the truck springs.

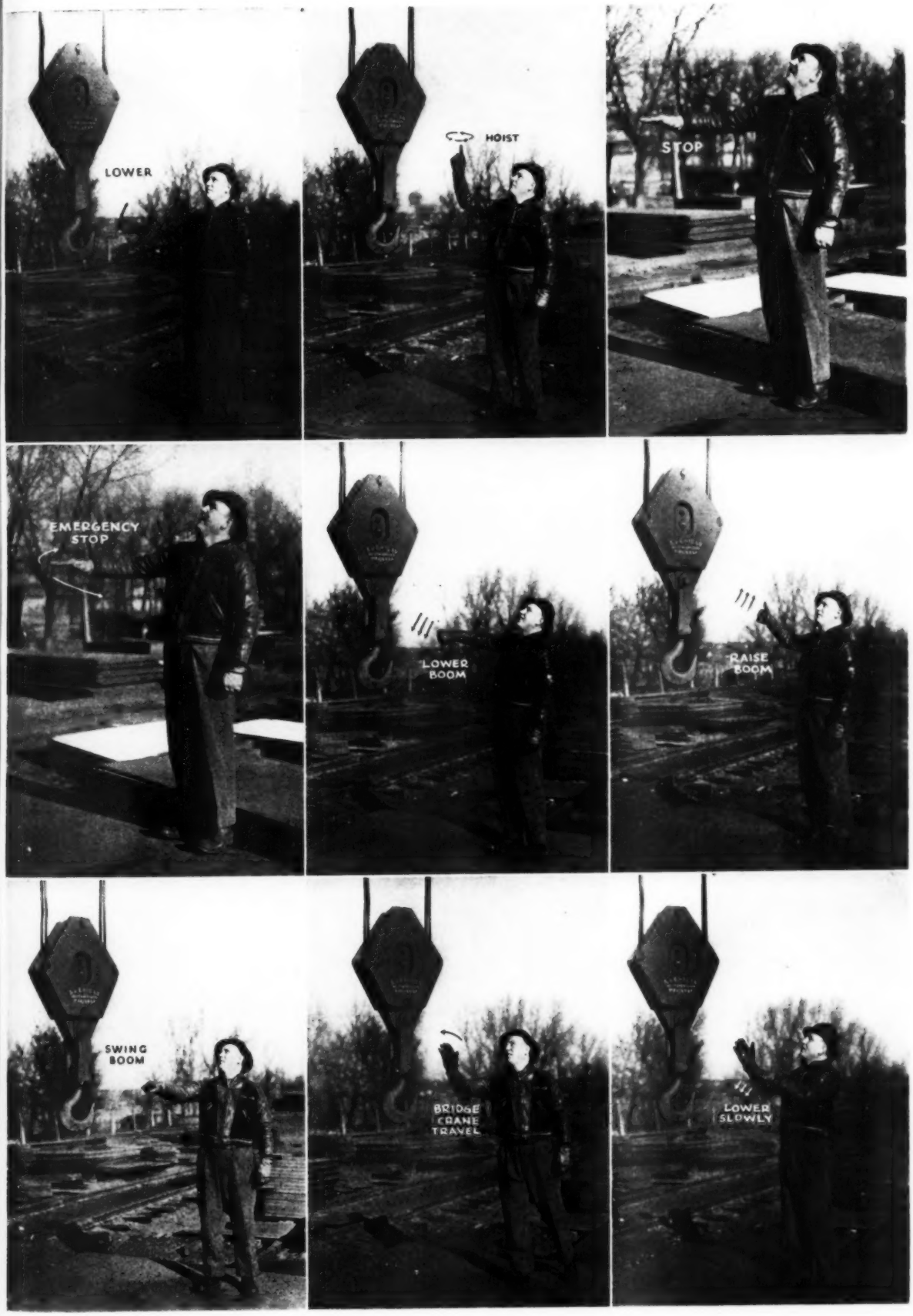
A locomotive crane shall not be swung into position until it has been ascertained that cars will not be moved on the adjacent track and proper flag protection has been obtained.

When traveling, the crane boom should be carried in a plane, approximately parallel with the direction of motion.

See opposite page for signals for crane operators. These signals are used by all signal men when making signal to crane operators (Signals in accordance with American Standard, B30.2-1943).

Do not travel crane with current applied to empty magnet.—AMERICAN HOIST & DERRICK CO.




LOWER
HOIST
STOP
EMERGENCY STOP
LOWER BOOM
RAISE BOOM
SWING BOOM
BRIDGE CRANE TRAVEL
LOWER SLOWLY

Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the annual meeting of The American Pulp and Paper Mill Superintendents Association, held in Poland Spring, Maine, June 17-20, 1946.

The Man in the Middle

EDWARD A. JACKMAN
Asst. Personnel Mgr.
Oxford Paper Company

For the past 15 years the foreman has been the man in the middle. He has been the center of attention for both management and labor and his activities have been reviewed critically by both sides. He has been in the middle of the labor-management struggle.

Do you remember the great drive of the unions between 1930 and 1940? Do you remember the sit-down strike and the development of the C.I.O.? One of the favorite grievances of unions during that period was the foreman. The unions accused the foreman of favoritism, of partiality, of mismanagement and a score of other hideous crimes too numerous to mention. If you could believe the unions' organizational propaganda—working men were forced into unions to seek protection from that monster—the foreman.

The unions yelled so long and lustily that management soon started to doubt the ability of the foreman. In fact, it wasn't too long before management openly admitted the inefficiency of their chosen representatives. As soon as management realized the nature of the problem, sweeping reforms were promised through a cure-all known as foreman training. Experts who could train the foreman in six easy lessons came from all directions. First the unions attacked the foreman, then management followed suit, and finally management sought to clarify the situation by confusing the issue and by belittling the foremens' stature in the organization.

In the late 30's and early 40's, one of the most widely discussed subjects in Industrial Relations was "foreman training." Suddenly the country was at war and then the great hue and cry became production and more production. As the tempo of this demand for goods increased, the foreman regained some of his stature in the industrial family. Once again he became an important cog in the machine. His stature increased as the war progressed. In many instances it was recognized that his skill and knowledge contributed materially to the record production of all war materials. Suddenly something happened — the Foremens' Association of America crashed the headlines and in Case No. 7-R-1884, March 26, 1945, in re: Packard Motor Car Company and Foremans' Association of America, the N.L.R.B. ANNOUNCED: "a Bargaining unit composed of foremen in modern mass industry is appropriate for purposes of collective bargaining under the N.L.R.A.; prior contrary decisions are overruled."

Can you imagine the audacity of the creature to do a thing like that; biting the hand that has led him and fed him through these years, turning a cold shoulder to those who have protected him and sheltered him, deliberately destroying the organization he had helped to build. Now, he, too, has struck a mortal blow at free enterprise.

Again the foreman is in the middle of the union-management struggle.

The great strife of the 30's was not hard to understand. It was clever union propaganda. But why has the foreman suddenly switched his affection from his master to his old adversary?

For years he has seen the men and women who work for him and who are union members get more pay, get increased vacation benefits, more job security, better working conditions and a host of other concessions—while the foreman has had little or nothing. It is only natural that the foreman should want to play the same game—"gimmie something for nothing and I'll pay $1.50 a month dues."

The foreman has seen his position change from an important one to a minor one in the industrial setup. No longer is he the boss of his own department. He cannot hire, fire or discipline and in many organizations, he is not allowed to make recommendations regarding employees. In the matter of production, his hands are tied because management has bargained production standards with the union. Many of the functions he formerly performed are now the duty of some service department. Management holds him responsible yet fails to give him the necessary tools to carry out his responsibilities. His prestige is gone, his hands are tied, and he does not like it.

From my personal observation it seems obvious that many foremen dislike their jobs. They don't feel happy as foremen. Much of this is due to the way foremen are selected. Usually we choose a man who had been a good steady, loyal employee, who was never late for work, who never quit early, who never made any trouble in the department, who never took time off without permission, who worked all the extras we wanted him to work, who was faithful in the performance of his duties, and excellent in the operation of his machine. We selected him as a foreman because he was a good workman and not because he possessed the qualities of leadership. No wonder he is unhappy in his foreman's job—he is not qualified for it. His training and temperament are not adapted to good foremanship. We failed to pick the right man and we failed to help him. He received very little pre-foreman training and he received no further training after he took the job—yet he was considered a part of Management.

In the grievance procedure negotiated by the Company and the Union, the foreman is usually included as the first step. Frequently he is by-passed with the approval of management. In some companies he is not allowed to make a decision on a grievance unless he first consults with higher management and then learns his answer verbatim. All too frequently he is told what to say without being given the reason for his answer. This type of action breaks down his morale because he is belittled in the eyes of his employees and his prestige is diminished because he is not allowed to discharge the functions of his job. If he is a part of the written grievance procedure—make him a part of the real grievance procedure.

Frequently the foreman has no way of presenting his personal grievances. He must talk with his own boss and that is as far as he is allowed to go. Beyond that is sacred territory, reserved for only the selected few. Why not allow him the same rights as the employees who work for him. They are allowed to present their grievances to top management.

In the cumbersome procedure of "going through proper channels," the foreman is frequently the last man in the company to be advised of company policy. The Union through its shop steward system sends messages through its organization quickly and efficiently. All too frequently the foreman is told for the first time by a shop steward about some new policy. The foreman just loves that.

Management rarely consults the foreman about problems in his own department. His knowledge gained by long experience is frequently ignored by the service departments of his company. He is told what to do and how to do it and he is expected to accept the instructions without a question. If he does make a suggestion he is reminded that the company pays experts in the personnel, research or engineering departments to handle such matters. If the company listens to the foreman, it may be to humor him. Rarely does the company eagerly seek the advice of the foreman.

Finally the matter of pay must be mentioned. The foreman's earnings in many cases is about the same as the earnings of the employees in his department; and in many cases it is less. When the worker is called on for overtime, he receives premium pay but when the foreman is called on for overtime, he does it for his love of the company. Prior to the war, there were real differentials between the earnings of these two groups. During the war the workers received pay increases because of the political astuteness of the unions in dealing with the WLB. The foreman received little or nothing because the company could not satisfy the Treasury Department, consequently in many cases differentials in pay ceased to exist.

The day is here when management must make a decision!

Do we really want the foreman as a part of management? Are we willing to pay the price to make the foreman a part of management? It would be much easier to say the foreman is not a part of management.

Model "E" Undercut showing safety control levers under table, push button controls, and illuminated index tape. (Gear guards removed)

It's NEW Straight thru!

The SMITH & WINCHESTER MODEL "E" UNDERCUT TRIMMER

A NEW Smith & Winchester Undercut Trimmer from the ground up, to meet the exacting requirements of the modern finishing room for a fast, accurate Trimmer, safe in operation, accurate, and capable of high volume production. The Trimmer is one of the most important cogs in the production line of the paper mill. Work spoiled at the trimmer is work nearly completed and the cost of spoilage resulting from inaccurate trimming would be prohibitive. Look to the new Smith & Winchester Model "E" Undercut to completely satisfy your trimming needs. Bulletin giving full particulars mailed on request.

- Heavy one-piece base frame
- Anti-friction bearings on drive shaft
- Disc type friction clutch
- Back gauge operated by variable speed, reversible motor for accurate setting
- Push button control
- Illuminated index tape
- Gears properly guarded

Serving the Paper Industry Since 1828

The SMITH & WINCHESTER Manufacturing Company
SO. WINDHAM, CONN.

Do you think foremen in our industry want to join unions or do you think they want to be a part of management? I am sure that I do not know the answer for the industry as a whole—but the foremen I know personally tell me that they would prefer to be a part of management. I am led to believe by other personnel men that foremen in their plants prefer to be a part of management. A foremen told me recently "I am getting sick of being kicked by both the company and the union. I don't mind getting kicked by one crowd but two against one is too much."

There are a number of steps Management can take to solve this problem.

We must improve our methods of selecting foremen. We must select men who are leaders, and who are temperamentally able to withstand the strain of the job. We need men with the ability to be leaders in addition to their ability as machine tenders. We must recognize the fact that foremen are managers of manpower and their job is to get others to do things for them and for the company. Foremen must be able to direct, control and motivate those under their supervision.

We should develop a program of continuous education for foremen. I say education rather than training because the program must be broad in scope, not merely limited to the operation of their machines. Foremen not only need specific information related to their own departments, but they need much supplementary information. We should utilize the lecture, the conference and direct contacts to broaden their scope. What material should be included in this program? Why not let foremen have a voice in determining what they want and need? This education of foremen will be a long, tiresome, costly program. It must be continuous to be successful. Results can not be achieved in a day or in a month and the program can not be a success unless it receives the wholehearted backing of foremen and top management.

One of the most difficult steps we must take is to make foremen a part of active management. We must include them in the company's communication system. They should receive information from the company as quickly and as accurately as the shop steward is advised by the union. We must include them in the consultive organization. We must give them prestige in their own organization. Foremen can be advised of company policy through the foremen's manual. Better still have them assist in the preparation of such a manual by analyzing their duties in relation to standard policies and practices and by calling top management's attention to any omissions or discrepancies. In this way, foremen will gain a fuller knowledge of their own job and its place in the organization. Set up committees of foremen to recommend and discuss policy. The quality of their contributions will surprise you. Be sure that the foreman has an opportunity to participate in recommendations that involve him or his department. Let them have representation at union negotiations and let them present the supervisory view point. Make the company's communication system a two way affair—both up and down. Make it easy for foremen to be a part of management. They will contribute materially to the success of management if you will give them the opportunity to be a part of management.

Give them status in the organization. They deserve proper working conditions, good offices and individual recognition. When they do an excellent job, let them know their performance has been recognized and let the rest of the organization know it too. Don't bawl them out in front of their employees and don't belittle them in front of the union. Remember that foremen are human beings and they deserve to be treated with at least the same amount of individual consideration from their superiors as they in turn expect from the foremen.

To make them a part of active management, give them praise when it is due, ask them for their ideas, keep them advised of policy and plans, take them into your confidence and be fair and sincere in your daily dealings with them. Remember the front door to active management must swing both ways.

Foremen are one of the most important keys to successful labor relations. In order to participate successfully in the grievance procedure, they need sufficient

Find out how

NAYLOR Light-weight PIPE

Does the work of heavy pipe at lower cost

Why use heavy-wall pipe when there is a light-weight pipe built to handle the job?

Though light in weight, Naylor Pipe has the exclusive Lockseam Spiralweld structure that provides the greater strength, leaktightness and safety needed to handle jobs normally requiring heavy-wall pipe.

Advantages include twice the footage from the same tonnage of steel. Savings on installation costs up to 50 per cent. Reduced handling expense. High salvage value.

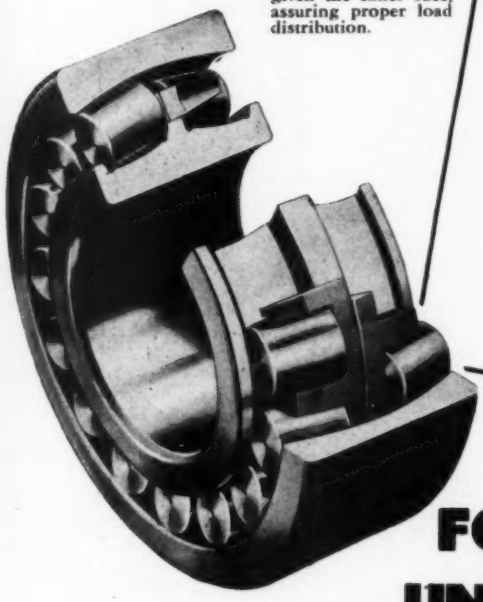
The new Naylor Catalog tells the complete story of Naylor performance and economy with a special section devoted to the paper industry. Write for your registered copy today.

NAYLOR LOCKSEAM SPIRALWELD PIPE

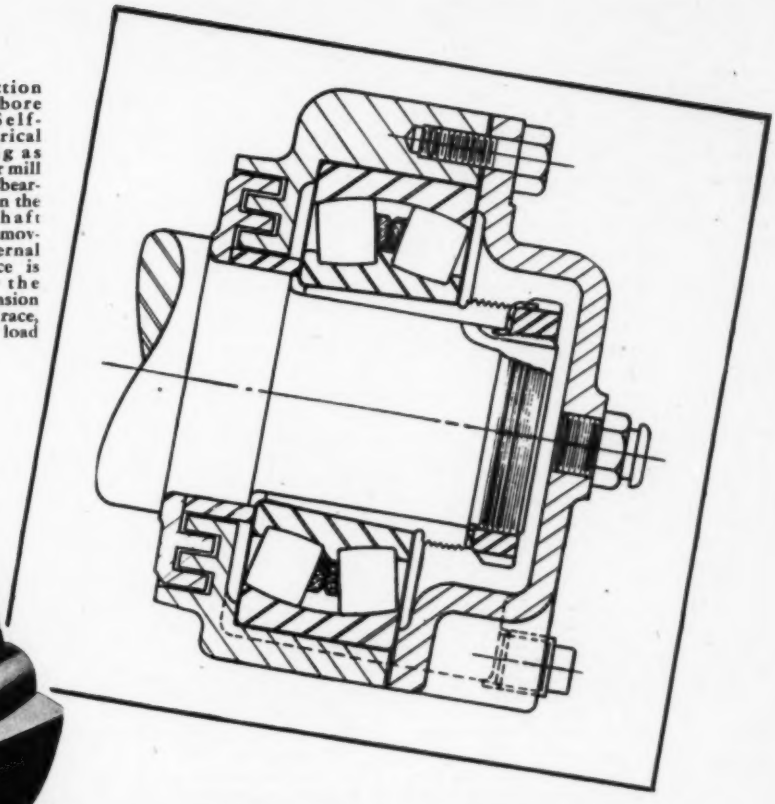
NAYLOR PIPE COMPANY

1236 EAST 92nd STREET • CHICAGO 19, ILL.

New York Office: 350 Madison Ave., New York 17, N. Y.



This cross-section shows a taper bore Torrington Self-Aligning Spherical Roller Bearing as applied to a paper mill press roll. The bearing is mounted on the shouldered shaft by the use of a removable sleeve. Internal running clearance is controlled by the amount of expansion given the inner race, assuring proper load distribution.



FOR DEPENDABILITY UNDER HEAVY LOADS

...Torrington Self-Aligning Spherical Roller Bearings

High speed production of quality paper requires dependable bearing performance in heavy-duty paper making machinery... one of many reasons why the Torrington Self-Aligning Spherical Roller Bearing is of major importance in the paper industry.

Efficient, maximum-capacity operation is assured by the free-rolling self-alignment of the Spherical Roller Bearing under shaft deflection, heavy loads or temperature variations. Features such as high radial capacity... two-directional thrust capacity ... unit construction for easy assembly ... make this bearing an outstanding choice for Fourdrinier and Cylinder Machines, Jordans, Pulp Grinders, Chippers, Machine and Super-Calenders.

Let the engineering staff of Torrington's Bantam Bearings Division show you how the Spherical Roller Bearing can improve the efficiency and economy of operation of machines you design, build or operate. For further information, write for our Bulletin No. 200 or contact your nearest Torrington Representative.

THE TORRINGTON COMPANY
BANTAM BEARINGS DIVISION · SOUTH BEND 21, IND.

TORRINGTON BEARINGS

SPHERICAL ROLLER · STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

authority and knowledge to allow them to function properly. The union will find out quickly if the foremen are really a part of the grievance procedure. Labor relations will improve if the foremen will and can settle grievances. Many foremen are reluctant to participate actively in grievances because they fear loss of prestige if they are wrong. Foremen who are part of management will quickly grasp the importance of their being an integral part of this procedure. Let's make them an active factor in the grievance procedure —not just a mouth piece for some higher authority.

The unions have made great drives on seniority and security in the past years. These drives have substantially increased the security of their members and have lessened fears about loss of jobs. Foremen see this in their daily work and wonder what security they have in their jobs. They should know their positions in the organization and what will happen to them in a time of depression and lay-off. Have the foremen complete knowledge of their rights and privileges above those of the workmen? Do they know about sick leave plans, pensions and others factors of security? Make them feel that their jobs are secure.

Finally, there is the relatively unimportant factor of money. Since all foremen work for their love of work instead of their love for money, this subject should not be discussed at all. As long as unions talk about money we are forced to do likewise. In many companies this matter of compensation has been very carefully studied and adequate programs have been established. In other companies foremen's salaries are such a closely guarded secret that the salary structure is completely inadequate. There are several points that should be considered in a study of salaries.

1. Foremen should earn more money than the men they supervise.
2. Some type of job evaluation should be used to establish a definite salary relationship between all positions in the organization.
3. Foremen should participate financially in increased productivity caused by their own efforts. They should also share in any cost reduction occasioned by their own efforts. Reward them for good management.
4. The foremen's basic salary should be reviewed frequently in light of their contributions to the success of the organization.
5. If foremen are required to give more than a normal amount of time to their jobs, pay them accordingly.

The problem before us is a complex one. Do we really want foremen as part of management. If the answer is "Yes," we must carefully and truthfully analyze every phase of our relationship with foremen. If the answer is "No," it is obvious what procedure will be followed.

Whatever we decide to do, let us take foremen out of the middle of the labor-management struggle. You determine whether they are to be part of labor or management.

Problems of the Printer and How the Paper Industry Can Co-operate with Him

GEORGE H. PETERSEN, Director
Printing Testing Laboratory
S. D. Warren Company

In speaking of the printer, reference is made to the letter-press printer as well as the offset lithographer, both small and large; the big edition printer, the specialist, and the commercial house.

I would like to make a comparison of the important departments of a printing plant with those of a paper mill.

The processing of the various pulps and other ingredients could be compared with the plate work and typesetting departments of a printing plant.

The beaters can be compared with the makeup and lockup department of a printing plant.

The paper machines with the printing presses.

The coating, calendering and sorting with the bindery of a printing plant.

Time lost on a paper machine is profit lost in the finished product.

And so it is exactly with the printer; to have paper that will enable him to operate his presses without delays due to paper troubles.

It is a well-known fact that the printing industry is a highly skilled craft and which is amply reflected in the products of the many classifications, but, it can also be rightly said that the printer is a converter of various allied printing materials.

Some printing establishments may make their own type, or make their own plates, or have their own cameras, or make their own inks, and, recently, some few make their own paper. Others go so far as to make some of their own presses. But, nevertheless, the end use is type, plates, ink and paper, which is converted very skillfully into mediums for the progress and posterity of mankind.

For those printers that purchase type, plates, ink and paper (and that group comprises the majority by far), it must be taken for granted that they expect such material to function properly and, in a manner that past experience of such use has set up a precedent that is the guidance of their present and future sales and promotion.

And they rightfully should do so, because that is good sound business ethics. Consequently, the expectant performance of such materials is relied upon with surety when reputable materials are purchased.

But when, during the performance period of any one such material, and in this case, we will refer specifically to paper, becomes cranky or refuses to co-ordinate with the mechanical units of the press or bindery machinery, there immediately is a slowdown of production and if this slowdown of production assumes such proportions as to effect the pre-estimated time for the particular operation, the operators will become concerned about their time limits, so consequently, they will report their encountered trouble to their superiors. That is as it should be.

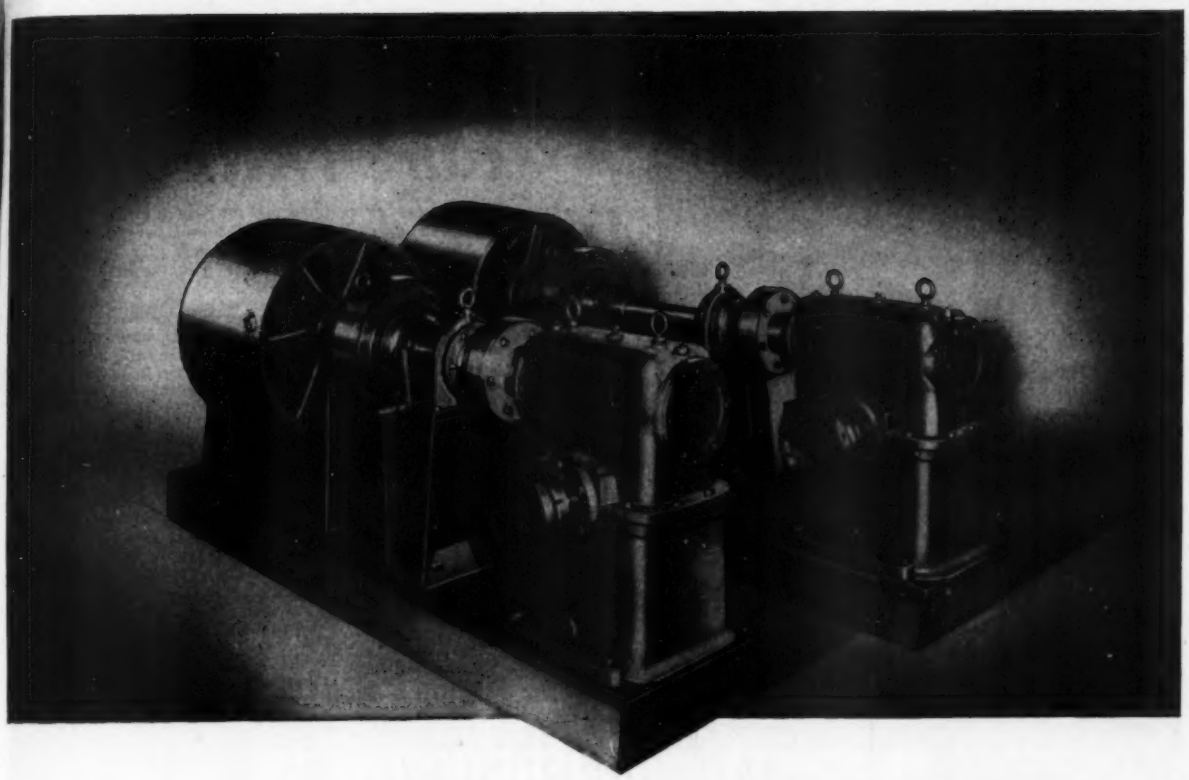
A skid of paper humped on top like a camel's back will invariably prevent the feeding mechanism on a press of properly delivering a sheet down to the guides and grippers. It is true that in some instances by inserting a series of wooden wedges strategically around the outer edges, the top can be fairly well leveled out.

Then there is the skid load that has a decided dished in top, much like the old nag's back that has been retired to the pasture.

Also, there are occasions when shooks have to be inserted by the paper maker to level out the load. Although, this correction makes the skid load look nice, nevertheless, it reduces the printing press operator's production, because, when the paper is run down to the shook, the operator has to stop his press, lower the lift on which the skid rests, pull out the shook, and then raise the lift again in position with the feeder. Usually some adjustments are necessary to the suction cups, combers, etc. Such unnecessary operations take time and at the expense of so many hundred or so many thousand sheets depending on the length of time of delay and the speed of the press.

There are many kinds of curling—caused by many conditions both in the printing plant and in the paper mill. Also, there are torn sheets, wrinkles, calender cuts and pasters.

There are clay lumps causing plate batters that not only tie up the presses but also result in costly plate repairs or remakes.



Bagley & Sewall NEW ASSEMBLED DRIVES

• An enclosed Worm Gear Unit, Magnetic Clutch and Cone Pulley, as illustrated above, is only one of several different variations of Bagley and Sewall Floor Drives as assembled of standard stock parts. Depending upon speed, ratio and power requirements of each application, the units may be composed by using Hypoid Gears or Spiral Bevel Gears instead of Worm Gears; also, the clutch may be of any type Friction Disc, Magnetic or Airflex. Instead of a cone pulley other types of variable or fixed speed methods may be employed.

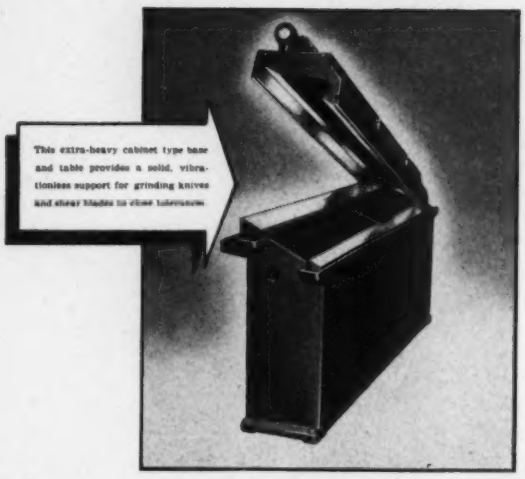
BAGLEY B&S SEWALL

THE BAGLEY & SEWALL COMPANY

Builders of Paper Making Machines

WATERTOWN, NEW YORK

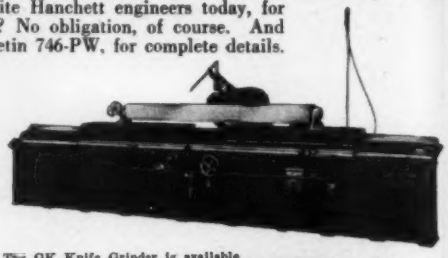
Here's Why GK KNIFE GRINDERS can "TAKE IT"


This extra-heavy cabinet type base and table provides a solid, vibrationless support for grinding knives and shear blades to close tolerances.

These massive, precise castings are the secret of the GK Knife Grinder's all-out durability—the real reason why it stands up under gruelling production schedules hour after hour, without dropping a hairline in accuracy! On the GK, there's no chance of a poor grinding job, due to vibration or chatter.

The new GK is completely automatic . . . no skilled operator needed. Simple design . . . for minimum maintenance. All feed works grouped in a single unit, mounted in front . . . for easy, quick inspection. All moving parts run in a constant oil bath.

Perhaps the GK is the answer to your knife maintenance problems. Why not write Hanchett engineers today, for their advice? No obligation, of course. And ask for Bulletin 746-PW, for complete details.



The GK Knife Grinder is available with Hydraulic Drive, as shown here, or with Mechanical Table Traverse.

ELECTRIC BRAZERS
ANVILS AND HAMMERS
BAND WHEEL GRINDERS
MISCELLANEOUS SAW & KNIFE FITTING EQUIPMENT

HANCHETT MANUFACTURING CO.
SAW AND KNIFE FITTING MACHINE DIVISION
BIG RAPIDS, MICHIGAN U.S.A.

★ SAW SHARPENERS
★ SAW STRETCHERS
★ KNIFE GRINDERS
★ SWAGES AND SHAPERS
★ WELDING CLAMPS

In producing and supplying paper for the printer, the papermaker is not only manufacturing paper to sell but is actually tendering a service to the printer through the medium of paper, so the printer can operate a business at a profit.

It has been said that color and finish is what sells the paper, but that appears to be largely a paper salesman's point of view. If such a paper does not perform economically for the printer, then color and finish do not mean very much. Therefore, it seems that performance would be the uppermost requirement of a paper (and consistently too) and that color and finish is only an added feature or an embellishment identifying its maker.

I make this statement however, with some qualification, because it may be said that paper without good finish is not conducive to quality printing. True, but what good is high quality finish when the paper itself will not run through the press economically?

Performance then should be the uppermost requisite of printing paper, that kind of performance that will make the printer's job economical to run through his press; then the paper should have that kind of finish that will reproduce the quality the printer's customer expects and then there should be the color that puts the grade at hand in its field and gives brilliance and life to the printed image.

To bring about this realization of the printer's problems by the papermaker, there are some policies that could be practiced to create splendid co-ordination.

For instance: a series of talks on printer's problems by a printer of broad and varied experience to small groups of coating and calender stack operators and to guillotine cutters and packers, has been found to bring tremendous results in places where it has been tried. Every operator likes to know what the end use is of the product he produces and how the paper is handled and the processes it goes through in a printing plant. He then can produce his work better with such a vision of printing procedures.

These informal talks could be extended to such other groups, like department heads, in the mill that would benefit by them. They could be held in a centralized location during working hours.

It seems that an awful lot could be gained if the key men and department heads in a paper mill could have the opportunity to see printing plants in operation and know something about the operation and function of the various types of printing presses and accessory equipment. Most such men are hungry for just such kind of knowledge, because it is the natural desire of every worker to do his work in a manner that will give satisfaction to the printer.

Feeding mechanism on printing presses, for instance, vary with each type of press, although the basic principle of operation and function is generally the same. They are designed and constructed to handle paper that presumably is flat but the nature of the unit is such that the tolerances are not too great in regards to wavy or humpy piles of paper stock.

Then we have the human element that enters into the successful operation of a feeding unit and when it comes to improvising, when difficulties are encountered, some individuals succeed solving the problem better than others.

Therefore, it is so important to produce and deliver paper that can be run through the press with the least amount of inconvenience.

Just because one printer was able to handle a difficult lot of paper satisfactorily, it is not said that every other printer is lacking in ingenuity. Circumstances, shop conditions and the type of work can be very complex, consequently, there can be no forecast.

In speaking of printers, they might be classified into two types, commercial and the specialty house. The commercial printer might handle anything from a business card to a huge catalogue; whereas the specialty house might concentrate on one kind of an item, let's say, greeting cards.

Every job the commercial house produces is tailor-made and the specifications on each order vary considerably, which is an opportunity for many variables to creep in. The greeting card house, on the other hand, has reduced the number of their variables by grouping their orders into a few general groups.

But, both types of printers have much in common with each other and that is they both use paper and probably very similar paper in some cases.

In either case, if paper quality and per-

Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 19 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS

Map Copyrighted by L. D. Post, Inc., New York. American Map Co., N. Y.

HIGH LIGHTS:

Michigan ranks second among the States in tonnage of paper annually produced. She won this position by nosing into the one million ton class in 1927, is giving New York a close rub for first place, but is hard pressed by Maine and Wisconsin.

Michigan is the original producer in the United States of Mitscherlich sulphite pulp. The process patented in Germany about 1882, had been purchased by August Thilmany in 1886, who transferred the rights to the International Paper and Fibre Company. A mill was erected at Alpena by G. N. Fletcher and Albert Pack, lumbermen, under Thilmany's supervision, to utilize refuse from their lumber mills in the manufacture of Mitscherlich sulphite.

As the wood suitable for pulp was prodigally used up, Michigan lost her preeminence as a pulp producing state, but kept on gaining, nevertheless, in the manufacture of a widening variety of papers. By the importation of pulp wood and wood pulp, and by the very extensive use of refabricated waste papers, Michigan mills have kept their State out front in the papermaking race.

Michigan's annual production, exceeding one and one quarter million tons, is the fruit of 67 Fourdrinier, 46 cylinder and 10 Yankee paper machines.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST PITTSFIELD, MASS. • WILLIAM N. CONNOR Jr CANTON, MASS. • L. H. BREYFOGLE KALAMAZOO, MICH. • CHAS. E. BERTSCHY MILWAUKEE, WIS. • W. L. CAMPBELL SAVANNAH, GA. • BALFOUR GUTHRIE & CO. Ltd. PACIFIC COAST

formance, and I want to put emphasis on performance, is not uniform from lot to lot, the printer is likely to run into difficulties.

There comes a time in the course of papermaking, that a certain standard formula for a sheet of paper is changed slightly, either from the standpoint of necessity or for its improvement. Sometimes these slight changes require a little different manipulation of printing technique, such as a softening of the ink, for example.

Consequently, when a change is necessary in the formulation of a grade of paper, and the mill by predetermined tests found that some adjustments needed to be made in the printing operation, the printer should be apprised of such printing requirements. That is rendering real service. Theoretically, the papermaker should know exactly how to economically and efficiently print on his products.

The paper industry today is manufacturing better and finer paper than they ever have before, and, during the abnormal period of the last four years, it has been nothing short of miraculous in the way high quality paper was produced. Discounting color and presence of dirt specks, I think paper as a whole, has been printing better than ever before and whatever difficulties the paper industry has encountered, the printing industry has been very considerate when they ran into paper troubles in their printing plants.

The coming era of printing and with its many processes and adaptations of effects, the demand by the printer is going to be more exacting than ever, and with the greater demand for color and process printing it will require much closer cooperation to the finer details that the printer has to wrestle with and the real tendering of a service to the printer will be a sheet that presents no problem to print economically.

D&T MICROMETERS SNAP GAGES & SPECIAL TOOLS

Bow and bar type micrometers with sliding mandrels that give you 6 in. of range with 3 standards. Capacities: 0 to 6 thru. 162 to 168.

Interchangeable Anvil Micrometers with 3 setting standards insure 6 in. of measuring accuracy.

Snap Gages—Rigid construction accuracy from 5 in. upward.

Tubular frames are of highest quality welded construction. Micrometer heads produced by nationally recognized manufacturer.

DAVIS & THOMPSON CO.
MFRS. OF MACHINE TOOLS & MICROMETERS
MILWAUKEE WISCONSIN

Some National and International Aspects of the Pulp Situation

JAMES RITCHIE, Assistant Director
U. S. Pulp Producers Association

The wood pulp industry of the United States is by all odds the largest in the world. Its present capacity of 12,000,000 tons a year is more than twice the record production of Canada, the second most important pulp producing nation of the world, and more than three times that of Sweden, the third ranking nation in wood pulp production.

During the five prewar years 1934-38, the United States produced on an average 24 per cent of the total world supply of wood pulp. During the latter years of the war, it produced almost 50 per cent of the total world supply. The United States and Canada together supplied at least 90 per cent of the entire war-time pulp requirement of all the United Nations.

The United States is even more important, internationally, as a consumer of wood pulp than it is as a producer. During the prewar years 1934-38 this country consumed 43 per cent of the world's wood pulp supply, either directly or in the form of paper imports. At present, at least 60 per cent of the total world supply of pulp is used in the manufacture of end products consumed in this country.

The United States is currently consuming a larger share of the total world supply of wood pulp than at any time in recent history. Our current consumption is 50 per cent greater than our average prewar consumption, while consumption in other major markets averages perhaps 50 per cent less than prewar. With world recovery, the rate of increase in the demand for wood pulp will accordingly be greater abroad than at home. This country will thus have to become more and more dependent on its own resources for its mounting pulp and paper requirements.

During World War II domestic producers furnished this country with 90 per cent of its total new supply of wood pulp, as contrasted with a prewar average of 72 per cent.

This record is the more remarkable when it is considered that practically all expansion in the industry ceased, by government mandate, on December 7, 1941. The expansion that made possible this unprecedented production record was a prewar development. It was inspired, not by the prospect of war, but by a fortunate conviction on the part of individual pulp producers that the ultimate trend of demand for the industry's products would be sharply upward.

Fortunately, too, the industry's prewar expansion was principally in those grades most urgently needed for the war production program; our war-time production of kraft pulp, for example, was more than three times that of 1935.

This industry was thus better prepared to meet the impact of war than almost any other basic American industry. Increased domestic production and increased imports from Canada, equitably distributed through an ably administered system of pulp allocations, effectively met the essential demands of our national war production program.

Similarly, the transition from war to peace has been less difficult for the wood pulp industry and for its dependent industries than for most American industries. In the pulp industry, that transition has been affected without serious loss of production time. Industries directly and indirectly dependent upon pulp for their operations have, as a whole, not only survived the transition but have benefited materially as a result of it.

The paper industry, for example, during the fourth quarter of 1945 and the first quarter of 1946 operated at the almost record rate of 18,000,000 tons per year as contrasted with a production rate of 17,200,000 tons during the corresponding period a year ago. This increase in paper production during the transition period is due to a number of factors, chief among which are the following:

1. More efficient production by the integrated mills as a result of the termination of pulp allocations. The "withholding" provisions of the pulp allocation order, while unquestionably necessary, nevertheless prevented efficient utilization both of fibre and of the productive equipment of integrated mills.
2. Increased production by converting mills as a result of increased importations of wood pulp.
3. Improved operating efficiency in both integrated and non-integrated mills as a result of the liquidation of controls governing war-time paper production. Production schedules could be arranged with a view to economy of operation and maximum output rather than war needs.
4. Improved labor conditions particularly at the mill level. Employment in pulp and paper mills increased from a war-time low of 142,000 in September, 1945 to a recent high of 156,600 in January, 1946.

The task of further increasing pulp and paper production is a difficult and yet extremely important one. Millions of dollar's worth of capital and thousands of man-hours of employment hinge on the success or failure of this effort, for economic values and jobs accumulate with every ton of pulp and paper that is available for consumption in this country.

Achievement of this goal is a challenge to you production and technical men of this industry.

The Civilian Production Administration, in March of this year, certified to the OPA that our national paper and board requirements in 1946 would total 18,000,000 tons. There is little doubt but that demand throughout the balance of this year would justify an even higher rate of operation.

When You're Cramped for Space...

NORMA-HOFFMANN EXTRA LIGHT PRECISION BEARINGS — available in both ball and roller types—offer engineers and designers the advantage of high anti-friction efficiency combined with compactness and light weight. In many cases, they have proved to be the only solution of problems where friction-free operation must be had, in extremely restricted space.

Made to inch dimensions, the "S" and "XLS" BALL BEARING series cover a size range from ⅛" to 22⅛" bore; and the "RXLS" ROLLER BEARING series ranges from 1⅞" to 22½" bore.

Our Field Engineers are at your service, to aid in selecting and applying these light bearings to your purposes. They will gladly put their experience to work for you. Write for the Catalog.

NORMA-HOFFMANN
BEARINGS CORPORATION
Stamford, Conn. Established 1911 — Precision Ball, Roller and Thrust Bearings
FIELD OFFICES: New York • Chicago • Cleveland • Cincinnati • Pittsburgh • Detroit
Los Angeles • San Francisco • Seattle, Wash.

---

for
DEPENDABILITY
DESIGN·SERVICE
UNIFORMITY AND
FINISH

Appleton FELTS

APPLETON WOOLEN MILLS APPLETON, WIS.

Disregarding prospective increases in non-paper pulp demands, our minimum national wood pulp requirement for 1946, based on an 18,000,000 ton paper and board production will total an estimated 12,300,000 tons.

A 1946 requirement of 12,300,000 tons for domestic consumption and export would contrast with the 1945 requirement of 11,500,000 tons.

Until recently, the prospect of procuring this minimum tonnage requirement appeared rather dim. Price ceilings on wood pulp, prior to April 22nd, were such as to discourage both maximum domestic production of market pulp and increased imports. Domestic pulp producers, confronted with rising wage and wood costs and declining profits, had serious doubts as to their ability to maintain overall production, let alone increase it. European suppliers clearly indicated that unsatisfactory price levels in this market would make it necessary for them either to ship their current output to more profitable markets or to curtail production.

The OPA's issuance of revised price ceilings on April 22nd, however, has materially brightened the pulp supply outlook. These advances, while not as great as either the domestic producers or the foreign suppliers had indicated would be necessary to insure adequate pulp supplies, should nevertheless result in a material improvement in 1946 wood pulp receipts. As a result of these increases, there is now at least a reasonable prospect that 1946 wood pulp supply may balance consumptive demand.

In 1945 the United States and Canada supplied approximately 11,100,000 tons of wood pulp for the domestic consumption of 11,363,000 tons.

An equivalent volume from these sources in 1946 would leave an unsatisfied demand, on the basis of estimated minimum overall requirements, of 1,200,000 tons.

This unsatisfied demand must be met by (1) European imports, or (2) Increased supplies from the United States or Canada, or (3) Withdrawals of pulp from inventory.

It is conceivable that total imports of European pulp might reach 900,000 tons in 1946. It seems unlikely, however, that they will exceed that amount. Rumored cut-backs in third quarter Swedish reservations, if they become effective, could reduce this prospective volume.

United States and Canadian pulp production in 1946 will continue to depend largely on the success of current wood procurement programs.

Shortages of trucks, equipment, and manpower are still hampering pulpwood production in both countries. Wood difficulties will have an adverse effect on third quarter pulp shipments, particularly from the West coast. Competitive demands for wood for Housing may still further jeopardize the industry's wood procurement programs.

If imports from Europe should approach the 900,000 ton mark, an increase of only 300,000 tons in the new supply from North America would provide the supplementary tonnage needed to satisfy an estimated minimum 1946 wood pulp requirement of 12,300,000 tons.

There is every reason to believe that domestic demands for paper and consequently for pulp, will continue to mount. More people are using more paper and paperboard for more purposes than ever before. The current trend of population in this country is sharply upward. Per capita demand is increasing with the development of new uses and the expansion of old. The net effect will be an expanding domestic demand for pulp and paper.

If the same trend holds true for all other major pulp and paper consuming countries, how can the markets of the world be satisfied? Certainly for a number of years the principal sources of supply will continue to be those countries which have been the major sources in years past—the United States, Canada, and the Scandinavian countries. Their ability to meet this growing world demand must depend principally upon the availability of wood resources. So again we get back to wood as the crux of our problem.

The forest land area of the United States is almost 4-½ times that of the Scandinavian countries, while the combined forest land area of the United States and Canada is 10 times that of Scandinavia.

United States pulp production requires less than 10 per cent of its total forest cut; Canadian, 28 per cent; and Swedish, 40 per cent.

On the basis of these figures, it would certainly seem that the United States pulp and paper industry, with a properly managed forest economy, should be in a position to meet fully its long-term share of the growing burden of world's pulp and paper requirements.

Morden Methods of Stock Preparation

C. W. MORDEN, President
Morden Machines Company

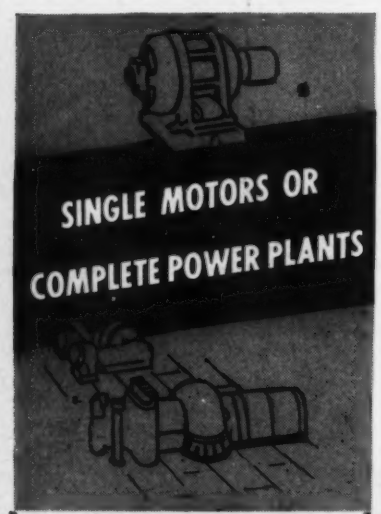
If we get down to fundamental principles in speaking of methods of stock preparation, it can be said that there are only two basic methods. The older method employs batch treatment; the modern method, continuous treatment. The trend in industry, as a whole, is toward continuous production methods. In our own industry one only has to think of the paper machine to readily get his own mental picture of what continuous production methods mean, in terms of production efficiency and results, as compared with early day methods of papermaking.

Just as on the paper machine, successive continuous operations follow one another —forming, pressing, drying, etc.—so in a multi-treatment production line hookup of Morden Stock-Makers, beating type treatment (with multi-pass treatment of the stock in one or more units) may be followed, in continuous sequence, by refining type treatment (single pass operation) in other Stock-Maker Units. Thus, both beating and refining treatment may be combined in a continuous production line operation. Similarly, parallel treatment may be followed by series treatment; separate treatment, in the case of two or more pulps, with subsequent blended treatment. It is simply a matter of setting the controls to get the type, the amount, and the combination of treatment desired. Stock-Makers are especially designed for (multi-treatment) operation in the way mentioned.

Ten years were required to develop the Stock-Maker in its present form. Its practical pattern has been shaped by a lifetime of paper-mill experience. In this development and particularly in the studies of its best type of application under various conditions, the assistance and co-operation of practical mill men like yourselves has been invaluable.

Two methods are employed in this machine for keeping foreign material out of the treating elements. Heavy foreign material drops out of the stock in the large sump at the entrance of the machine. Smaller tramp materials, such as clips and fasteners, are centrifugally extracted inside the machine before getting into the treating members and are collected in the sump below the treating elements prior to removal.

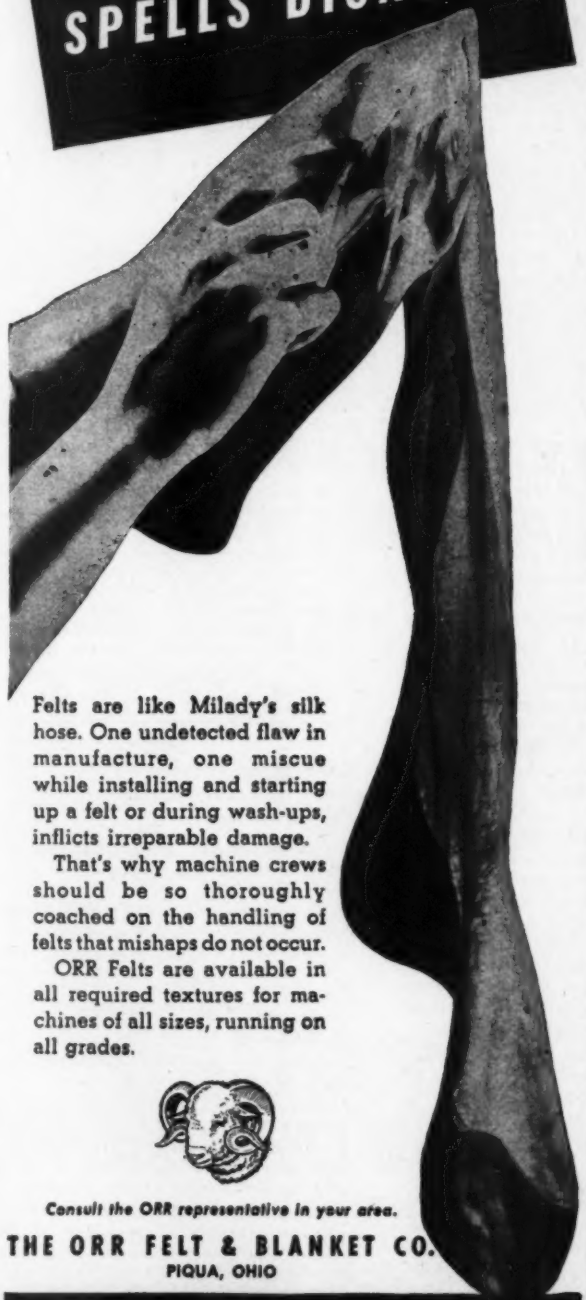
Stock-Maker Continuous-Flow treatment action is a distinctive reverse flow (Revflo) sealed pressure treatment with controls providing for multi-pass recirculating treatment in the machine for Beating Action, or single pass non-recirculating treatment for Refining Action (Multi-Treatment). Excellent hydration and fiber



Generators • AC & DC Motors • Air Compressors • Motor Generator Sets • Turbo Generator Sets • Transformers • Rentals • Switchboards • Rebuilding • Repairing

CHICAGO ELECTRIC CO.
1313 West 22nd Street
Chicago 8, Illinois

ONE MISCUE SPELLS DISASTER



Felts are like Milady's silk hose. One undetected flaw in manufacture, one miscue while installing and starting up a felt or during wash-ups, inflicts irreparable damage.

That's why machine crews should be so thoroughly coached on the handling of felts that mishaps do not occur.

ORR Felts are available in all required textures for machines of all sizes, running on all grades.

Consult the ORR representative in your area.

THE ORR FELT & BLANKET CO.
PIQUA, OHIO

Orr Felts

ATLANTIC 33

NON-TEMPERING

SAFETY

TOOL STEEL

A tool steel that requires no drawing of temper. Simply forge and quench in plain water.

Our Improved FLUTAGON *Shape*

DISTINCTIVE

VACUUM GRIP

SAFER

Tools Identified At A Glance
No time lost looking for brand marks, stamps or labels which disappear or are obliterated in use.

Forging Made Easier
No sharp corners to hammer into surface as on octagon and hexagon shapes.

Forging Cracks Greatly Reduced

A Convenient, Positive Grip
Unexcelled for chisels, punches, cutters and blacksmith tools.

Safer Performance
Shape reduces possibility of pieces chipping and splintering off head.

Greater Safety Assured In Work
Tools do not roll off workbench or sloping surfaces as do other shapes.

Reduces Loss of Tools and Saves Time

SUGGESTED FOR THE FOLLOWING PURPOSES

- Beater Bars
- Bed Plates
- Cams
- Chippers
- Chisels (Hand and Pneumatic)
- Concrete Breakers
- Cutters
- Drag Lines
- Grate Bars
- Hammers
- Machine Knives
- Knives
- Logging Tools
- Punches
- Rivet Sets
- Scrapers
- Shear Blades
- Slitters
- Cold Chisels
- Blacksmith Tools
- Boring Tools
- Rivet Busters
- Track Chisels
- High Temperature Resisting Bars for All Hot Work

Buy ATLANTIC — it's a STEEL

ATLANTIC STEEL CORP.

1775 BROADWAY • NEW YORK, N. Y.

Developers of Non-Tempering Tool Steel

length retention are characteristics of this treatment with low power requirement.

Sealed Pressure Treatment is a combination of two factors: high Hydrostatic Pressure developed and sealed within the Stock-Maker and high Bar Pressure (brushing action) applied to the fibers during treatment.

The hydrostatic pressure balance in the Stock-Maker is such that it seals the stock between the treating elements during its treatment and assists in its hydration. The hydrostatic pressure is developed and balanced as follows: Stock is delivered to the Stock-Maker at approximately 25 lb. pressure; as it passes through the interior of the rotor, blading steps this pressure up approximately 31 lb. higher; this pressure forces the stock in reverse flow direction between the bars of the rotor and bed plate shell; this flow is opposed by the 25 lb. counter-pressure developed by the pumping action of the bars on the rotor; thus sealing the fiber between the bar faces and producing a potential pressure in the valve and outlet chamber (upper right in cut-away view) 6 lb. greater than the original inlet pressure. This 6 lb. pressure affects the transfer of stock from the valve chamber back into the inlet chamber in recirculating type of treatment. When recirculating type treatment is used within the Stock-Maker, build-up of pressure to 56 lb. with subsequent drop-off to 25 lb. alternately subjects the stock to high and low hydrostatic pressure (sponge action) which further assists hydration.

Recirculation in Stock-Maker produces a blended type treatment, similar to that of the beater in which some fibers are treated more and some less than others as compared with single pass refining type treatment in which the amount of the treatment of the individual fibers is more nearly uniform. With recirculation treatment the outlet pressure from a Stock-Maker is the same as the inlet pressure. With non-recirculating treatment the outlet pressure is approximately 6 lb. higher than the inlet pressure.

High bar pressures are essential for the effective and efficient continuous treatment of pulp, particularly where it calls for heavy treatment. Stock-Makers are designed for high bar pressure treatment up to the limit that the pulp will permit. This is accomplished by setting up the bed plate shell in relation to the rotor. A micrometer type adjusting mechanism, along with the three-point mounting of the bed plate shell, provide very close adjustment of the amount of bar pressure applied. The hydrostatic pressure balance, noted above, maintains a continuous fiber film on the bar faces under this high bar pressure.

The bed plate shell and rotor in the machine are both one-piece, heat-treated, alloy steel members. This one-piece construction permits accuracy of machining of these parts and contributes to the maintenance of this accuracy of relation between the treating surfaces of the filling members throughout their life.

One very important point that has been carefully studied in the Stock-Maker design is the matter of proper bar speed for the best overall results. In this study, in which a variable speed motor was used in order to determine the best speed, 900 rpm was selected as the speed giving the best performance. 900 rpm produces a maximum bar speed which is around 4200 fpm.

150 hp., 900 rpm motors are normally used to treat sulphite and similar pulps; 200 hp., 900 rpm for kraft. Operating power is usually 20 per cent to 25 per cent under rated motor horsepower and total horsepower per ton is normally much less than for beater and jordan treatment. Standard induction or synchronous type motors may be used, as there are no special starting requiremnts

Tonnage throughout per day per Stock-Maker may vary from a few tons to 100 tons or more. Stock-Makers are built in only one size and are especially designed for use in multi-unit hookups, in which the number of units is determined by the treatment characteristics of the pulp, amount of treatment required, and the tonnage to be handled. A minimum amount of space is required for such an installation.

Various pretreatment applications are now in service and in some cases pretreat pulp ahead of beaters and jordans and in two recent mill applications the sulphite content of the groundwood-sulphite machine-coated paper is separately treated and then mixed with the groundwood, with very interesting results as compared with the mill's previous treatment of the mixed furnish.

In many mills Stock-Makers are used to supplement existing beater and jordan treatment. In some cases they are located between the beater chest and the machine chest. Rag content bond papers are being made in this way. In other applications they are located beyond the machine chest and directly ahead of the jordan, from which the stock goes direct to the paper machine. Beaters, in this case, are rightly used only for breaking and mixing.

One instance of this on paper grades which require highest quality treatment is the complete mill installation of Mordens at Rhinelander Paper Company's glassine and greaseproof mill at Rhinelander, Wisconsin.

Stock for Rhinelander Paper Company's "Big Swede" machine, the largest glassine machine in the world, is continuously treated direct to the paper machine with a battery of Morden Stock-Makers without the use of either beaters or jordans.

Stock-Maker's direct action control of stock treatment direct to the paper machine assures getting the paper machine settled down quickly on grade changes, and greatly improves the uniformity of paper quality. Stock-Maker's closed system type of operation contributes very definitely to the mill's cleanliness factor which is very important in the production of high quality papers of this type.

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 25-28, 1946.

Quality of Process Water Used in Kraft Paper Manufacture

LEWIS B. MILLER, Chemical Engineer
W. H. and L. D. Betz

The present paper represents a brief summary of the results of an investigation made by the TAPPI Water Committee (The Water Committee of the Technical Association of the Pulp & Paper Industry has the following membership: Lewis B. Miller, Chairman; C. M. Connor, Glassine Paper Co.; Miss L. E. McGrath, Booth Chemical Co.; R. B. Martin, Wallace & Tiernan Co.; W. F. Mitchell, Pennsylvania Salt Mfg. Co.; J. G. Patrick, West Virginia Pulp & Paper Co.; E. N. Poor, American Cyanamid & Chemical Co.) on the subject of the "Quality of Water Used in Kraft Paper Manufacture." This investigation forms a part of the comprehensive investigational program of this committee into the quality of water required for the manufacture of different types of pulp and paper.

A questionnaire on the subject in question was prepared by the Water Committee and distributed to manufacturers of kraft paper through TAPPI headquarters. Twenty-five mills replied. These mills had the following geographical distribution: ten mills from southern United States; eight mills from northern United States;

MISCO STAINLESS STEEL Corrosion Resisting CASTINGS

HEAT RESISTING - WEAR RESISTING

Successfully Used Throughout the Pulp and Paper Industry

Since the introduction of Misco stainless steel castings to the Pulp and Paper Industry twenty years ago, Misco has supplied hundreds of tons of digester fittings, fabricated parts, centrifugally cast pipe and related castings of these types.

Numerous patterns are now available for immediate use, and other designs can be quickly prepared for special service. Misco stainless steel castings are produced in several analyses best suited to particular conditions. They have one characteristic in common—the highest quality—which assures dependability and long life.

You are invited to make use of our facilities by freely consulting Misco on any stainless steel requirement. Technical data sheets will be mailed promptly upon request.

ALLOY CASTING DIVISION

Michigan Steel Casting Company

MISCO
Heat and Corrosion Resistant Alloys

One of the World's Pioneer Producers of Chromium-Nickel Alloy Castings

1999 GUOIN STREET • DETROIT 7, MICHIGAN

REMOVE

SCALE, SLUDGE, RUST

and other accumulation . . . with AURAND CLEANING TOOLS

FOR ANY HARD SURFACE: IRON — STEEL — BRICK — CONCRETE — ETC.

It's easy to remove paint, scale, rust and other accumulations with AURAND Cleaning Tools. Powered, rotary chipping does a thorough cleaning job in less time. No special skill required. Even depth surface is assured by an adjustable shoe control. Cutter heads are renewable.

For further information write Dept. 649.

AURAND MFG. & EQUIP. CO.
2643 Colerain Avenue • CINCINNATI, OHIO

Sometimes Lindsay Longcrimp has been known to bring down the cost-per-ton of manufacturing paper. May we talk it over with you?

Longcrimp was introduced by Lindsay in 1922. It has since made a distinct contribution to the art of manufacturing paper.

THE LINDSAY WIRE WEAVING COMPANY
Serving the Paper Industry Since 1903
14001-14309 Aspinwall Avenue • CLEVELAND 10, OHIO

Lindsay WIRES
FOR PAPER MILLS

TABLE 1

	Raw Waters Highest and Lowest Concentrations Reported, ppm	Process Waters Highest and Lowest Concentrations Reported, ppm	Permissible Upper Limits for Process Waters, ppm as Specified by Different Mills
Turbidity as ppm SiO_2	0.0 to 1000	0.0 to 200	5, 10, 50
Color in color units	0.0 to 200	0.0 to 40	10, 20, 20, 30
Total solids in ppm	0.7 to 400	0.7 to 400	100
Iron as ppm Fe	0.0 to 40	0.0 to 1.6	0.5, 0.5, 2, 10, 20
Manganese as ppm Mn	0.0 to 1.0	0.0 to 45.0	0, 2.0
Carbonate hardness as ppm $CaCO_3$	0.0 to 372	0.0 to 100	300
Noncarbonate hardness as ppm $CaCO_3$	0.0 to 274	0.0 to 216	None specified
Methyl orange alkalinity as ppm $CaCO_3$	0.0 to 276	0.0 to 219	120, 300
Phenolphthalein alkalinity as ppm $CaCO_3$	0.0 to 12	0.0	100
pH	5.8 to 8.3	6.1 to 7.7	6.0 to 8.0, 8.0, 6.4 to 8.0
Sulphate as ppm SO_4	0.0 to 200	0.0 to 33.6	100, 400
Chlorides as ppm Cl	0.0 to 200	1.4 to 200	10, 20, 75
Silica (soluble) as ppm SiO_2	0.29 to 53	2.3 to 53	7
Organic matter in ppm	0.0 to 54	0.0 to 54	trace, 0.1, 10
Dissolved solids in ppm	0.7 to 400	10 to 250	100

four Pacific Coast mills; three Canadian mills.

Of the twenty-five mills replying eight use sub-surface (well water) and seventeen use surface water. Of the latter, seven mills report that the surface waters which they use are contaminated by sewage or industrial wastes.

Of the twenty-five mills reporting, eleven use mechanical treatments to fit the raw water for process use. These treatments include screening, sedimentation, and filtration. Eight use chemical treatment, including alum to provide flocculation and chlorination.

The data presented in Table 1 indicate that the waters used for process purposes in kraft paper manufacture (it should be clearly understood that this does not include the preparation of kraft pulp), vary over the broadest range in dissolved and suspended constituents. A few of the data are somewhat doubtful as is the case of the raw and process waters which are reported as containing only 0.7 ppm dissolved solids since such waters would constitute a very high grade of distilled water. Obviously waters of the widest divergence in quality are being used for kraft paper manufacture.

At the present time there is considerable activity in the field of kraft pulp bleaching with new pulp mills being installed and present mills converting to bleaching operations. As progress continues along this line and more kraft paper is manufactured from bleached pulp, there will be a tendency to use process water of higher quality in order to maintain the color and quality of the resultant paper.

The questionnaire also provided other useful information.

The mills have reported on the water constituent which is most important to control in each particular case and these are variously indicated as being: suspended solids, iron, carbon dioxide, color, turbidity, *p*H, organic matter, manganese, and odor.

The reasons for controlling each of the constituents in question are reported as follows:

Suspended Solids and Turbidity—(1) Raises ash content of sheet, (2) Lowers strength and erodes equipment, (3) Affects color of bleached sheet, (4) Affects quality and cleanliness of sheet, (5) Causes pinholes in sheet (suspended solids), (6) Affects "freeness" of stock, (7) Increases "dirt count" of sheet.

Carbon Dioxide—causes corrosion.

Color—affects color and brightness of finished sheet (bleached stock).

*p*H—affects sizing.

Iron and Manganese—affects color and brightness of sheet (bleached stock).

Odor—affects odor of paper used in wrapping food products.

Carbon Dioxide and Alkalinity—causes foaming and difficulty in pulp washing.

Chloride — affects electrical insulating properties.

There is general agreement among the mills reporting that microbiological growths cause difficulty. The specific ways in which these growths prove troublesome are reported as follows:

Nineteen of the 25 mills report operating difficulties such as—(1) Breaking of sheet, especially at the couch roll, (2) Responsible for frequent shut-downs and wash-ups (loss of operating time with consequent loss of production), (3) Clogging of piping.

Eight mills report reduction in product quality, such as:—(1) Slime spots, (2) Dirt and holes in paper, (3) Spots and discolorations (probably due to iron or manganese crenothrix growths).

The annual loss in dollars (or the equivalent) due to microbiological growths is variously reported as—(1) $24,000.00, (2) $200.00, (3) 3% of operation time, (4) Estimated at $0.25 per ton of paper produced.

In order to control biological growths the following treatments are used—(1) Five mills report the use of chlorinated phenols, (2) Four mills report the use of mercury compounds, (3) Seven mills report the use of chlorination, either alone or with treatments other than ammonia,

ENGLISH ECCO CLAYS CLAYS
TRADE MARK
UNIFORM • SUPERIOR • DEPENDABLE
English China Clays Sales Corporation
551 Fifth Avenue, New York City

ATTENTION, PULP MILLS

Quality Begins or Ends in Your SCREENS

Coarse or worn Screen Plates rob you of the quality you strive for. New, fine cut, high-capacity plates assure quality pulp —and with a very small investment cost.

High corrosive-resistant Bronze or Chromium plated.

FITCHBURG
Screen Plate Co., Inc.
301 South Street
Fitchburg
Massachusetts

LAMINATED PAPERS

HAVE you planned for the unusual demand for this type of product after the war? • Ask about machines for laminating foil, paper, glassine, cellophane and boards. • We build them for pastes, glues, asphalts and waxes. • Can we send complete information? Ask us.

•

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

PEERLESS CENTRIFUGAL PUMPS

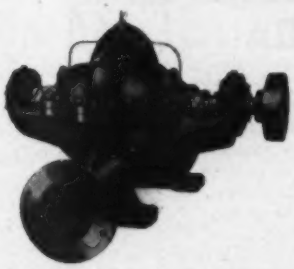
(FORMERLY DAYTON-DOWD)

FOR INDUSTRIAL USES

PEERLESS PUMPS

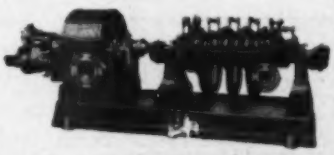
CAPACITIES TO 60,000 G.P.M.
A COMPLETE RANGE OF SIZES AND TYPES

PEERLESS TYPE "A"
FOR GENERAL PURPOSE PUMPING



Split Case; Single-stage; double suction; sizes: from 8" to 42"; capacities: up to 60,000 g.p.m.

PEERLESS BOILER FEED TYPE "B" PUMP



Designed particularly for boiler feed, oil refinery and pipe line service. Pressure: to 700 lbs.; sizes: 2½", 3" and 4". Multi-stage, automatically balanced type.

Peerless Centrifugal pumps are adapted for use in a wide variety of services including municipal, paper mill, sugar mill, mining, filtration, irrigation, chemical processing, food and refrigeration uses. Descriptive engineering bulletins available.

PEERLESS PUMP DIVISION
FOOD MACHINERY CORPORATION
Canton 6, Ohio • Quincy, Illinois • Los Angeles 31, California
DISTRIBUTORS IN ALL PRINCIPAL CITIES

(4) Six mills report the use of chloramines (chlorine and ammonia or ammonium salts), (5) Two mills report the use of copper sulphate.

White Water Re-use and Disposal

H. A. MORRISON, Sales Engineer
Oliver United Filters, Inc.

Twenty-five years ago, papermakers generally and honestly believed that high-grade-paper production necessitated sending most of the white water to sewer. It was stated that inclusion of white water solids in book or bond sheets, for example, inevitably led to weak, dingy, and dirty products. At that time, chlorination was seldom practiced.

Floor water containing dirt and oil often contaminated the wire and couch pit. Steel pipes added rust and scale to the white water. Shower water pressures were low and volumes of shower water were excessive. There were no save-alls able to make the high recovery of white water solids when handling large volumes of stock and water. In addition, there was but little pressure against stream pollution by industry.

The evolution and improvement of save-all equipment, also the use of non-corrosive pipes, tile-lined wire and couch pits, chemical treatment for slime control, use of less shower water at greatly increased pressure, the employment of coagulants such as glue or sodium silicate, and many other factors, combine to entirely reverse the picture.

Scientific control of white water is now not only possible but is an actual necessity.

It is generally known today that each paper machine should have its own save-all and should reuse its clarified white water to a large degree.

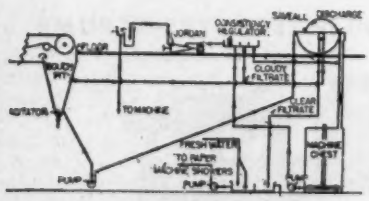


Fig. 1—Typical save-all installation on fourdrinier machines

Vacuum filter save-alls are now widely used and well established. They meet the exacting demands for high clarity white water suitable for re-use on all paper machine showers. The filtrates normally contain no long fiber, with total suspended solids considerably below 1.0 pound per 1,000 gallons. Table 1 gives typical results on various kinds of paper mill white water.

The advised arrangement for a vacuum save-all is shown for fourdrinier machines on Figure 1 and for cylinder machines on Figure 2.

The installations have much in common but each represents an arrangement evolved by experience.

The flow diagrams indicate that excess clarified water, beyond the volume continuously recycled to the paper machine, goes to sewer. It is obvious that volume to waste closely approximates that of outside water introduced into the machine circuit.

Table 1

Grade	Tons/ day	White Water gpm	Filtrate, lb./1000 gal.
News	100	1600	0.51
Kraft bag	80	1200	0.20
Container board	200	2000	0.75
GW tissue	35	850	0.65
GW hanging	65	1100	0.90
Standard book	40	750	0.85
Bond	50	950	0.45
Ledger	40	1000	0.30

It is the purpose of this discussion to show how to (1) minimize the flow to waste, and (2) how to condition this excess water to avoid pollution.

The following examples may indicate what can be done:

Example 1

When a paper machine operates on slush stock at 3% moisture-free consistency and makes 100 tons per day, the stock is roughly 560 gpm going into the machine circuit. On such a machine, the circulating load may be 1600 gpm. If no additional outside water enters the circuit at any point, and with due allowance for sheet going to dryers at 15% moisture-free or 112 gpm, it will still be necessary to waste about 448 gpm.

In contrast to the above, when the 100 tons of stock comes to the beaters in sheet form—at say, 80% dry—the volume added to the machine circuit amounts to only 21 gpm. In this case, 91 gpm additional water is needed to maintain balance in the system, as 1129 gpm. is carried away to the dryers. In both of these cases, all beater water for the machine is supplied from its own water circuit.

In practice, it has been found generally advantageous to send 15 to 20% of the well clarified white water out of the machine circuit. This is done primarily to prevent accumulation of dissolved substances which could induce foaming and promote slime growth.

Example 2

The case of a small mill making toweling on a cylinder and groundwood tissue on a fourdrinier is cited. Production is 35 tons daily, and the combined white water flow from the two small machines amounts to 500 gpm containing 5 pounds fiber per 1,000 gallons. One vacuum save-all will handle all of the white water, and the recovered stock can all be included in furnish to the cylinder machine without lowering the grade of its sheet.

Table 2

White Water (feed)	Case A	Case B
Filler, lb./1000 gal.	7.88	11.69
Fiber, lb./1000 gal.	8.72	15.90
Total insolubles, lb./1000 gal.	16.60 (too low)	27.18 (right)
"Cloudy" Filtrate		
Filler, lb./1000 gal.	5.42	1.79
Fiber, lb./1000 gal.	9.52	0.91
Total insolubles, lb./1000 gal.	14.94	2.70
Gpm	100	100
"Clear" Filtrate		
Filler, lb./1000 gal.	4.20	0.59
Fiber, lb./1000 gal.	2.03	0.24
Total insolubles, lb./1000 gal.	6.23	0.83
Gpm	400	400
		Shower water

A vacuum save-all, area 300 square feet, will clarify the 500 gpm white water to average below 0.50 pound insoluble solids per 1,000 gallons. Of the total 400 gpm can be recirculated for use at the various showers of the two machines, including all felt and wire showers.

Net recovery of machine furnish totals 3,240 pounds daily. Net daily loss in the excess 100 gpm going to waste amounts to only 72 pounds. With this system, alum usage is reduced about 60%. Heat losses are only 20% of previous averages. Reduced velocity of flow, because of reduced water demand, improves sand filter performance. Less dirt comes into the mill with the incoming process water, and cleaner paper is produced.

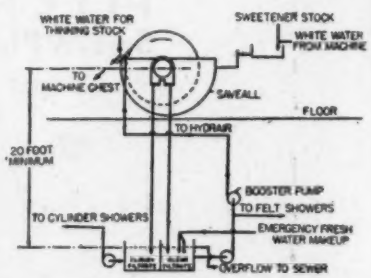


Fig. 2—Typical save-all installation on cylinder machine

As stated above, the daily production of 35 tons per day is realized when white water loss is only 72 pounds insoluble solids, equivalent of 0.01%. Dissolved solids in the wasted 100 gpm may represent shrinkage more than that of fiber. White water losses, in the mill under discussion, may thus be somewhat more. Maintenance of the save-all, labor, power, and fixed charges, together with depreciation at 10% per year, all amount to about $4,000.00 annually. Net return to the mill is at least four times the costs.

Disposal of the rejected 100 gpm, amounting to 144,000 gallons per day with "B.O.D. comparable to that of the stream" remains to be accomplished. Suspended solids in this water, 0.50 pound per 1,000 gallons, are probably low enough to avoid noticeable contamination of most streams or lakes.

Control of effluent water oxygen demand can be accomplished without excessive cost provided the volume is small as compared to tonnage of paper made.

Example 3—Book Paper Save-alls

The following is typical of vacuum save-all applications in chemical book paper mills:

The system as shown on Figure 1 is successfully used on many book paper machines, excepting that of the initial (cloudy) filtrate (usually about 20% of the total flow through the filter valve) is sent to a separate chest for beater use. Any overflow from beater chest gravitates to the couch pit and is recycled over the save-all.

The importance of recirculating the cloudy filtrate either for beater use or direct to couch pit is well shown in Table 2.

Synonymous with QUALITY for 65 Years

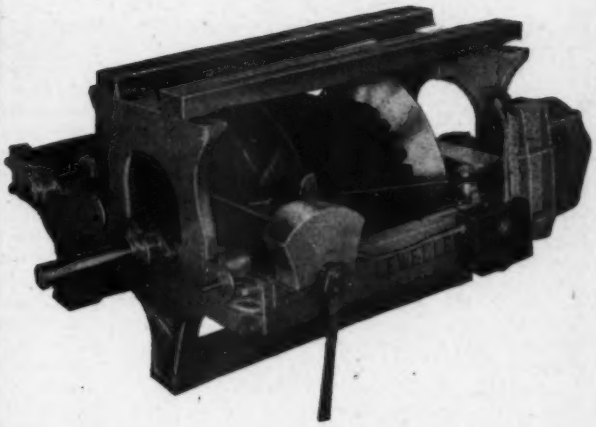
SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

Solvay Products for the Paper Industry

Caustic Soda
Liquid Chlorine
Soda Ash
Crystal Compound

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 Rector Street New York 6, N. Y.



Name your speed-control problem . . . chances are Lewellen has the answer!

● Illustrated above is one of hundreds of special applications of Lewellen Variable-Speed Transmissions.

Here a Lewellen automatically controls a veneer lathe and maintains a constant cutting speed at the knife. The control is connected to the knife table. As the knife advances toward the core of the log, the lathe speed is increased automatically to maintain constant cutting speed. When the knife is backed out to take a new log, the control will operate the spindle at the correct speed for the diameter of the log.

Look to the pioneer in speed-control engineering for the solution of your problem—look to Lewellen! Back of each Lewellen Variable-Speed Transmission and Motor Pulley is more than 45 years experience in speed-control engineering. Wire, phone or write today for complete information about our services. We want to help you!

LEWELLEN MANUFACTURING COMPANY, COLUMBUS, INDIANA

LEWELLEN

Variable Speed { TRANSMISSIONS / MOTOR PULLEYS

★ Lewellen knows speed control

The figures show two different conditions and results on a vacuum save-all handling 500 gpm white water on a machine making 35 tons per day 40 pound E. F. book paper. Poor recovery is realized when feed conditions are incorrect.

In A, ribbon trim going to couch pit was 1.5 inches wide on edges of sheet; while in B, the ribbons were 5 inches wide on each edge. No sweetener was added in either case.

Addition of sufficient jordanned machine furnish to increase white water (feed) consistency of A to correspond with that in B would have greatly charified both clear and cloudy filtrate to duplicate the excellent recoveries secured in B.

Excess clear filtrate on above machine, about 100 gpm goes into the deinking system. If sent direct to sewer, the loss of insolubles would be only 120 pounds per day.

It is essential to control and prevent slime growth in a paper mill where outflow is small. Chlorine, chloramines, or various other water soluble slime inhibitors may be introduced as the fresh water leaves the sand filters, and/or at the intake of the shower water pump which returns save-all filtrate for re-use. When the water to waste carries residual chlorine, it may be acceptably low in oxygen demand, and require no supplemental treatment.

Flocculation

Introduction of sodium silicate to promote floc formation and to minimize corrosion on raw water and white water is well established, as described by Baylis, Hay, Schworm, and others. Soda-alum treatment is effective over a rather wide range of conditions. Combination treatments, including certain applications peculiar to the paper industry, such as, use of a special glue and controlled aeration, clearly indicate that small volumes of process water containing very limited amounts of fiber in suspension, can be conditioned for rejection at moderate cost.

If simple chlorination of 4,000 gallons excess water per ton paper made, fails to meet state or federal standards, then the outgoing water should be impounded and given chemical treatment prior to (1) sending it to waste, or (2) returning it to mill fresh water intake.

The character of the impurities will determine what treatment is indicated. Appling and McCoy offer valuable suggestions regarding the use of disinfectants in paper mill white water.

Capacity and recovery on vacuum save-alls are both promoted by increased freeness of the feed; likewise, the ratio of fiber to filler in the feed mixture must not be disregarded.

The ability of the save-all sheet to retain short fiber and filler is comparable to that of a sheet on the paper machine wire. When the ratio of filler to fiber is greater than 2 to 3, additional filler-free fiber, preferably taken ahead of the jordans, should be added to save-all feed.

Literature Cited

1. Morrison, H. A. Efficient re-use of process water. *Paper Trade J.*
2. Baylis, J. R., Silicates as aid to coagulation. *Journal A.W.W.A.* 29; 1355. (1937).
3. Hay, Harold R., Water purification methods involving sodium silicates. *Journal A.W.W.A.* 36, No. 6, June, 1944.
4. Schworm, W. B., New developments in coagulation of water prior to filtration. Missouri Water and Sewerage Conference. Boonville, Mo. (1938).
5. Appling, John W., and McCoy, John F., Relative toxicity of disinfectants recommended for use in the paper industry. *Paper Trade J.*, Sept. 14, 1944; July 19, 1945, and November 8, 1945.

Reclaimer Treatment of White and Waste Waters

S. B. APPLEBAUM, Vice President
The Permutit Company

The treatment of various pulp and paper mill white waters and waste waters may be practiced to accomplish the following results: (1) recovery of water, (2) recovery of stock, and (3) avoidance of stream pollution.

A large and ever increasing number of pulp and paper mills are faced with water shortages. In some cases, the shortages have been insufficient to limit production but have interfered with mill expansion. In other cases, the shortages have actually threatened curtailment of production.

One obvious remedy for such conditions is to decrease the intake of raw water into the mill by treating, recovering, and reusing as much of the white and waste water as is practically and economically possible. This will vary with different mills and different types of white and waste waters. In most of the cases, the amount of recovery that is possible is high—well over 90%, and, in some cases, even higher.

As to the requirements for this recovered water, it should be low enough in suspended solids, especially in fiber content, so that it exerts no clogging effect on shower nozzles. Since the reclaimer to be described in this paper uses no wire but instead operates by filtering upwardly through a blanket composed of recovered stock, the removal of suspended matter is very complete. On numerous tests, fiber has never exceeded 0.2 pound per 1000 gallons; usually it has been under 0.1 pound per 1000 gallons, and this fiber, of course, is the proverbial "frog hair" kind. Also, where fiber removal alone is required, the use of a coagulant usually is unnecessary. If inorganic filler, such as clay and calcium carbonate are present, the use of a coagulant may be required to produce a clear enough effluent. In such cases, the amount of filler left in the recovered water depends somewhat upon the type of filler and the coagulant used but, in general, this will run to less than 0.4 pound per 1000 gallons.

Recovered waters are frequently more valuable than the fresh waters for their pH values, due to the effect of the alum used in sizing the paper, are usually very close to those desired and, therefore, this effects notable savings in alum that would otherwise be used up in killing the alkalinity of the fresh water. Also, in many cases, the recovery of heat units in the recovered water is an added advantage. In general, then, it may be said that the recovery and re-use of water is not only desirable but that it usually is also profit-

EXPERIENCE + SKILL + PRIDE of PRODUCT
= PUMPS "by Aurora"

Aurora Deep Well Turbines for all conditions—4" to 24"

The able performance of our pumps, with high efficiency and lasting dependability, fulfills the fundamental purpose of our business. The full range of types and sizes in which AURORA CENTRIFUGAL and APCO TURBINE-TYPE PUMPS are available meets practically every industrial pumping need. Put a PUMP "by Aurora" on that next liquids handling job. You, TOO, will LIKE it.

NSA Aurora Centrifugal Sump Pump

WRITE FOR CONDENSED CATALOG M

OR

SEE OUR CATALOG IN SWEET'S

SIZES FOR EVERY DUTY, LARGE OR SMALL

Type OD Hor. Split-Case Double Suction Single Stage Centrifugal

Type AD Hor. Split Case, Two Stage Centrifugal

APCO Horizontal Condensation Return Unit

Type GGU Side Suction Single Stage Centrifugal

APCO Single Stage Turbine-Type

Type GMC Close-Coupled Centrifugal

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

110 Loucks Street, AURORA, ILLINOIS

ATKINS

START COST-CUTTING IN THE WOODS

ATKINS CROSSCUT No. 9

Atkins can help you cut costs in the very first stage of paper making — felling pulpwood trees. "Silver Steel" crosscut saws in the hands of cutters will fell more timber with less back-breaking effort . . . That is because "Silver Steel" crosscut saws are segment ground for perfect clearance and smoother cutting. Only a "Silver Steel" has this Atkins developed feature. Only an Atkins has these tougher teeth for sharper bites and longer cutting periods. Users invariably report as much as two and three times longer service per setting.

OTHER **ATKINS** CUTTING TOOLS FOR THE PAPER INDUSTRY

Atkins makes a complete line of cutting tools and accessories for the Paper Industry including slasher saws, chipper and barkmill knives, circular paper slitters, flatbed paper cutters, shear blades, silver steel rule, etc. *Write for Atkins Booklet on Knife Care*

E. C. ATKINS AND COMPANY
Home Office and Factory: 402 So. Illinois St., Indianapolis 9, Indiana
BRANCH FACTORY: Portland, Oregon
BRANCH OFFICES: Atlanta · Chicago · Memphis · New Orleans
New York · San Francisco

NOT AN ORDINARY "V" TYPE PACKING

Garlock *Chevron* is entirely different from an ordinary "V" type packing. It has an exclusive hinge-like construction which allows the packing to expand as the pressure increases and contract as the pressure decreases. Friction on the rod and on the packing itself is thereby reduced to a minimum. Result: long, dependable service; reduced operating costs. Specify GARLOCK 430 CHEVRON for hydraulic service; 431 for oils at low temperatures; 530 for steam, air or gas; 531 for hot oils.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada, The Garlock Packing Company of Canada Ltd., Montreal, Que.

GARLOCK *Chevron* PACKING

able and this is especially the case when the recovered stock is reusable.

The amount of stock lost in waste waters is surprisingly large—over 50 tons per day, on a dry basis, in a number of the larger paper mills. To a great degree, this loss is because of the inherent inability of a wire to effect anything like a clean separation of suspended solids from water. Thus, when a mixture of fiber and filler hits the fourdrinier wire, a certain amount of fiber and filler is bound to pass through the wire.

Since the filler will pass the wire more readily than fiber, it is to be expected that the suspended solids in the white water will contain a relatively smaller proportion of fiber and a relatively larger proportion of filler than was present in the suspension before it hit the wire. This also holds true in the case of the wire on save-alls.

Therefore, while the fourdrinier may receive some 80% fiber and 20% filler, the recovered solids from the mill waste water in some cases may contain only 10 to 20% of fiber and as much as 80 to 90% of filler. Obviously, also, when products are being made in which no filler is added, the recovered solids consist practically entirely of fiber and the ash content will be quite low.

However, the recovered stock with the high filler content is particularly stressed because the value of this filler is often overlooked. In fact, many mills keep very accurate records on the tonnage of fiber lost in the waste waters but pay practically no attention to the much greater amount of filler lost.

Fiber is, of course, much more valuable than filler and fiber losses in most mills are far from negligible. Even a very small mill can readily lose over a ton of fiber a day in its wastes and losses of 5 to over 15 tons of fiber per day are common enough with the larger mills.

Both fiber and filler may be recovered in the reclaimer. If fiber alone is present, recovery is usually effected without the use of a coagulant as the fibers themselves seem to coagulate and form a suspended blanket of stock in the reclaimer, which very effectively filters the water as it flows upwardly through it.

When inorganic fillers are also present, the use of a coagulant is advisable. For most waste waters, dosages of several grains per gallon of alum will give a good coagulation. Activated silica has proven a valuable coagulation aid in certain cases, but whether to add it before or after the alum, or whether or not it should be used in any given case, should be decided by jar tests.

As to the density of the stock discharged from the integral concentrator of the reclaimer, this will vary greatly with different waste waters. In general, recovered stock consisting almost entirely of fiber will concentrate in the range of about 1 to 4% density. When filler is present, the densities will range from about 3 to 8%.

While it is true that with most waste waters, recovery of valuable stock and reusable water can be effected, either with or without a coagulant as the case may be, at very reasonable costs, there are some waste waters which are expensive to coagulate and which furthermore yield a recovered solids for which no use has yet been found. This is especially the case with some of the wash waters from the caustic deinking process. These, while their pH value may not be extremely high, usually are highly alkaline and contain a heavy load of colloidal organic matter.

Coagulation tests on many of these waters, direct from the washers, indicate prohibitively high dosages of coagulant. In other cases, coagulant dosages, while high, are not prohibitively so. As to types of coagulants, alum, sulphuric acid, ferric sulphate, calcium chloride and lime have been tried. Of these, lime is by far the cheapest but a series of jar tests is, of course, required in each case in order to find out what coagulant is the cheapest, on the basis of its effectiveness as well as its dosage and price, and the range of dosages required.

Dilution of these waters with other waste waters often reduces coagulant dosages to very small fractions of those required on the undiluted water. Even a brief survey will often reveal in the mill another waste water that will admirably answer this purpose. As to what is to be done with the recovered solids, this is not so simple. In some cases, they will be concentrated and pumped to disposal pits. In other cases, after concentration, they probably will have to be dried and burned.

In the avoidance of stream pollution, the Permutit Reclaimer is a valuable tool for its principle of filtering through a suspended blanket of recovered stock, instead of a wire, results in an incomparably better removal of the suspended solids. Briefly, the reclaimer consists of inner and outer compartments. The water to be treated enters the inner compartment, which is equipped with mechanically operated agitators. If a coagulant is required, it is added to and agitated with the water in this compartment. The agitation is controlled so as to exert the maximum aid in floc formation.

The direction of flow of the water is downwardly through this inner, agitator compartment. At the bottom of this compartment, the water passes through openings into the outer compartment. It is in this outer compartment that the stock blanket forms, because this compartment has a horizontal cross-sectional area which increases as the water flows upwardly. Therefore, the upward vertical velocity of the water steadily decreases as it ascends.

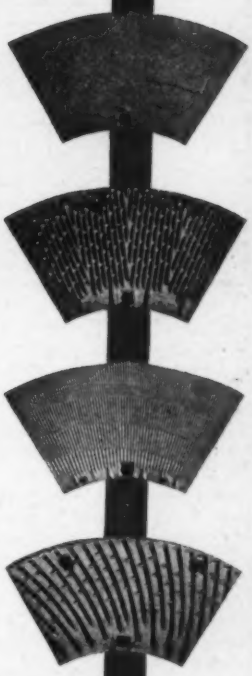
While the velocity at the bottom is sufficient to prevent the settling of the stock, the velocity at some level higher up is insufficient to lift the solids any further, and the water separates from the blanket in a fairly distinct plane. Thus, the particles form a suspended blanket of stock through which all of the water passes. The water leaves the reclaimer, through the flumes at the top, after it filters through this suspended stock blanket. As this blanket is some 7 or 8 feet in thickness, it is easily realized what an effective filtering action is effected.

Occupying a portion of the outer compartment of the reclaimer is the integral concentrator. The water present in the concentrator has no upward velocity. Therefore, it has no lifting power on the stock which settles in and concentrates in this concentrator. These concentrators are equipped with automatic hydraulic operated gate valves so that concentrated stock can be bled off at the same rate at which stock is being collected. Electric eye control of this automatic blowoff has now been developed so that the top of the stock blanket can be maintained at any desired level. Preceding the reclaimer is an air release tank on the influent line to remove bubbles which might

TENAX
"TENAX FELTS ARE TOUGH"
WHEN ORDERING FELTS
. . . Specify TENAX. There's a TENAX FELT to meet every specification, in making paper, board and allied products. Let TENAX bring you peak operating efficiency and greater economy!
LOCKPORT FELT COMPANY
NEWFANE, N. Y.
Serving the paper industry since 1891

Bauer

PULPER SALES SHOW GAIN OF 154%



These days such an increase in itself may mean little — until we add that repeat orders from satisfied users account for much of that increase.

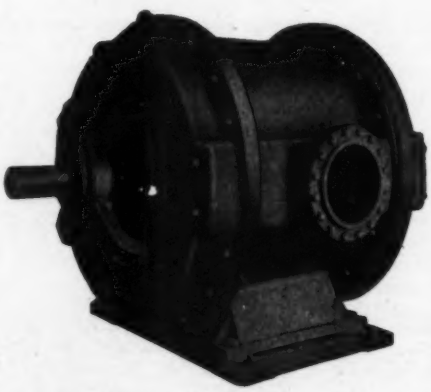
Five Bauers to mills making toilet tissue; *Ten* Bauers to mills running rotogravure, book and other fine papers — also newsprint. *Several* Bauers for another mill group running a wide variety of grades.

Still other Bauers for other large mills or mill chains.

Therein you have a true measure of acceptance of the Bauer Pulper for fast, efficient and economical pulping of a wide range of stocks, reject salvaging, etc. Two sizes. Full range of plate patterns. Further information, with technical data, furnished on request.

THE **BAUER BROS.** CO.
SPRINGFIELD, OHIO

ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES



One Moving Element. Non-pulsating Vacuum. No Internal Wearing Parts. No Internal Lubrication. Handles Liquid With Air. No Expert Attendance. Constant Efficiency. Low Maintenance Cost.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

BEARING METALS of Plus (+) QUALITY

NICKELITE PATENTED — TIN BASED

LEAD BASED — **CARBONITE** PATENTED

20 Years' Experience

bring you these metals—designed to minimize machinery and equipment maintenance in your mill.

"NICKELITE"
is the finest bearing metal that can be produced. Stands up under heavy loads and shocks . . . withstands heat . . . nothing finer for Calenders, Chippers, Jordans, Press Rolls, Beaters, Rag Cutters, Engine Quarter Boxes, etc.

We produce Carbonite in 4 grades, "CH"-"GP"-"No. 5 CH" and "IDEAL."

"CH CARBONITE"
is the finest lead based babbitt for heavy duty service—such as heavy, high speed, steady running loads. Effectively overcomes friction due to heat encountered in dryers, etc.

"GP CARBONITE"
is an all purpose metal. Runs cooler, wears longer, scores less. Adapts itself to misaligned shaft. Withstands heat . . . resists abrasion.

"NO. 5 CH CARBONITE"
is a serviceable low cost general purpose metal for bearings where load is steady running and free of shocks. It is hard, dense, close grained and tough.

"IDEAL CARBONITE"
—also low in cost—is ideal for general utility service where abrasion is encountered.

Our engineers will gladly work with you in solving your problems. Write for literature.

Carbonite Metal Co. Ltd.
BURLINGTON, WIS.

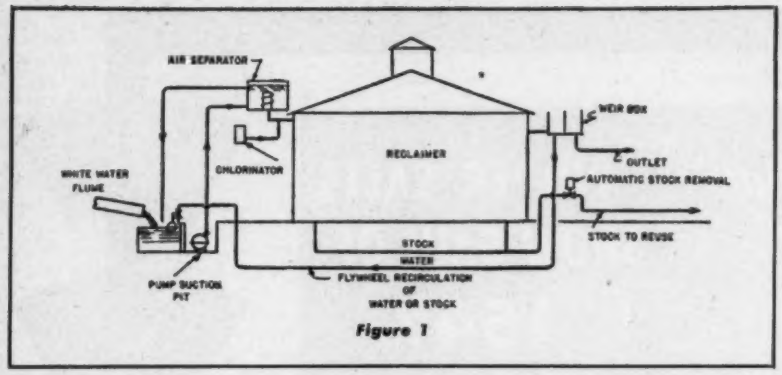


Figure 1

exert a buoyant action on the stock blanket.

Figure 1 shows the usual flow diagram. The raw water is first screened as it enters the pump suction pit to remove chips and slivers, etc. The pump elevates the water to the air separator from which it flows by gravity to the reclaimer. The effluent enters a weir box which splits the stream into two parts, one recirculating back to the suction pit, and the other to point of reuse. Recirculation of concentrated stock may also be found advantageous. A fly wheel effect is thus created which keeps the temperature and the flow rate through the reclaimer from fluctuating widely.

Water Requirements of Industry

LEWIS B. MILLER
Chemical Engineer
W. H. and L. D. Betz

In a professional capacity as a consulting engineer, the author's time is largely consumed in the design and installation of water treatment plants to provide suitable water for industrial processes and in the design of industrial waste treatment plants which have as an ultimate objective procuring for the industries and communities farther down stream raw water of improved quality for process and potable usage. Under the circumstances, it may be that a brief summary of the water quality requirements for different industries, with an even more brief discussion of the reasons therefor, drawn from the experience of the writer and from the studies of the TAPPI Water Committee, will serve to assist in emphasizing the importance of providing water of suitable characteristics for industrial usage.

For several years the TAPPI Water Committee investigated this subject and presented its findings in the form of reports and technical articles to the pulp and paper industry (TAPPI Special Report No. 298, Survey of paper mill water requirements. Report prepared by TAPPI Water Committee and published as a confidential report by the Technical Association of the Pulp and Paper Industry) (Miller, Lewis B., TAPPI survey of paper mill water requirements. *Tech Assoc. Papers* 23:433, 1940. This is a brief resume of Special Report No. 298) (TAPPI Special Report No. 333, Process water used for fine paper manufacture. Report prepared by TAPPI Water Committee and published as a confidential report by the Technical Association of) (Miller, Lewis B., Process water used in fine paper manufacture. *Paper Trade J.* Dec. 30, 1943. This is a brief resume of Special Report No. 333.) (Miller, Lewis B., Some water problems of the paper industry. Proceedings of the Fifth Annual Water Conference of the Engineers' Society of Western Pennsylvania, 1944, 125) (Miller, Lewis B., The use of selected waters in pulp and paper manufacture. Proceedings of the American Society for Testing Materials 44, 1944, and *Southern Pulp Paper J.* 7: 136, October, 1944). This committee work resulted in the preparation of a specification for the use of the paper industry (TAPPI Tentative Standard E 600 s-44, Chemical composition of process water for fine paper manufacture. *Paper Trade J.* May 25, 1944); most of the essential portions of this specification are as follows:

TABLE I—Recommended Water Quality for Fine Paper Manufacture (from Tappi Tentative Standard E 600 S-44)

Substance	Permissible Upper Limits in Parts Per Million (p.p.m.)
Turbidity as SiO_2	10.00
Color in platinum units	5.00
Total hardness as $CaCO_3$	100.00
Calcium hardness as $CaCO_3$	50.00
Alkalinity to methyl orange as $CaCO_3$	75.00
Iron as Fe	0.1
Manganese as Mn	0.05
Residual chlorine as Cl_2	2.00
Silica (soluble) as SiO_2	20.00
Total dissolved solids	200.00
Free carbon dioxide as CO_2	10.00

Control of these several inorganic constituents is important for the following reasons: Turbidity causes a loss of brightness and affects the color of the finished paper. Color in water affects the color of the resultant paper. Hardness consumes sizing materials and alum, and may cause scale formation at various points, particularly on the "wire" where the paper is being formed. Alkalinity consumes alum and may lead to undesirable foaming, causing pin-holes in the finished paper. Iron and manganese, present even in minute amounts, cause discoloration of the paper and possibly stains and spots. Soluble silica in sufficient concentrations causes "tinniness" in paper. Total dissolved solids may affect paper manufacturing operations and paper products in a variety of ways. It should also be pointed out that the presence of certain combinations of constituents in process water enhance the deleterious effects of each other so that the combinations are worse than the individual constituents alone.

The cotton textile industry uses the same two primary constituents in its manufacturing operations as does the paper industry, namely, cellulose and process water. It will be anticipated that textile manufacture will require water of similar quality to that used in fine paper manufacture and, within limits, this is the case. Additional processes, such as dyeing, require water of very high quality and such process water must be very low in hardness, iron and manganese, and heavy metals (Miller, Lewis B., Water in the textile industry. I. Process water; II. Textile wastes; III. By-Product recovery; IV. Steam production; V. Cooling Systems. *Cotton* 108, 1944, July, p. 85; August, p. 98; September, p. 107; October, p. 107 and November, p. 108. See also Technical Paper No. 96, W. H. and L. D. Betz, Philadelphia, Pa., for combined reprints of the above five papers.)

The rayon industry requires a very soft water of high purity. The manufacture of certain types of rayon yarn is particularly sensitive to the presence of heavy metals in the process water (Miller, Lewis B., Process water for rayon. *Rayon Textile Monthly* 26: 95, December, 1945). It should be added parenthetically that the manufacture of rayon, textiles in general, and paper are all affected by microbiological growths, giving rise to slimes, scales, corrosion, etc., in the water systems and the control of such growths is an essential part of the manufacturing operations.

Laundries require water somewhat similar to textile mills. Some of the more objectionable constituents of process water are heavy metals, iron and manganese, hardness, color, and turbidity.

A water low in alkalinity and substantially neutral in reaction is desirable for brewing and distilling. The water should be as nearly sterile as possible and suitable for potable purposes. Water containing much organic matter may create a musty taste and precipitation during storage. Iron and manganese must be low since they produce color and sometimes off-tastes with tannins. Some calcium sulphate and minor growth-producing substances are desirable for the best yeast development. Chlorine residuals must be eliminated.

Water for the food industries must conform to drinking water standards. In general, it should be soft, free from taste or odor, and low in manganese and iron. For baking purposes, the water should contain some calcium sulphate, although it is probably preferable to add this constituent to soft water along with certain minor constituents, which in combination with calcium sulphate, are effective as yeast foods.

Fortunately the developments in the art and science of water treatment are keeping pace with the needs of industry for waters of specific, uniform, and well controlled quality. Within limits, it is now possible to provide water of almost any reasonable quality from raw waters of the most diverse characteristics.

KEEP MILL MAINTENANCE COSTS DOWN WITH EASY OAKITE CLEANING

Care-Free Felt Cleaning!

One cause of early retirement of paper-mill felts may well be unsuitable selection or the improper use of cleaning materials. Those compounds having harsh detergency, excessive mechanical action or incomplete rinsing, tend to destroy the soft texture and vital absorbency of the felts.

Oakite materials are specifically designed for felt washing, de-liming and conditioning . . . for washing slacked felts on the machine and disassembled felts in the washing box; for acid-dissolution of calcium carbonate deposits; for softening and conditioning of lime-hardened pieces.

Whatever your felt-care problem, you can be sure that Oakite materials will quickly help restore natural absorptive properties and extend usable felt life. Write on a letterhead for job instructions. Ask TODAY for FREE 28-page Oakite papermill booklet! Of course, no obligation.

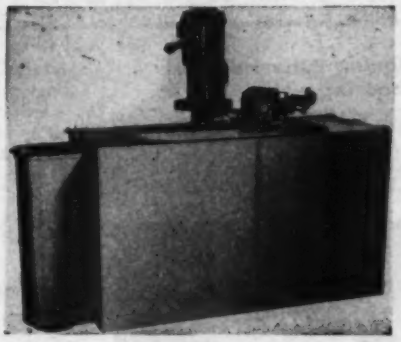
OAKITE PRODUCTS, INC., 16 Thames St., NEW YORK 6, N. Y.
Technical Service Representatives Conveniently Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**
MATERIALS · METHODS · SERVICE · FOR EVERY CLEANING REQUIREMENT

BIRK & CHOPORIS
CONSULTING ENGINEERS
30 NORTH LASALLE STREET
CHICAGO 2, ILLINOIS
PAPER MILLS POWER PLANTS
MEMBERS A.S.M.E. E.S.D.

Sandy Hill
IRON & BRASS WORKS
PAPER MACHINERY SPECIALISTS • HUDSON FALLS, N. Y.
BUILDERS OF SANDY HILL, BERTRAMS AND KAMYR EQUIPMENT

PERFORATED METAL *Screens*
Precision perforations in all sizes for large production and screen durability.
Copper • Steel
Monel • Stainless Steel
Chemical Resisting Alloys
The Harrington & King PERFORATING Co.
5654 Fillmore St., Chicago 44, Ill. 144 Liberty St., New York 6, N. Y.



The DeZurik Regulator will give accurate consistency control on installations:

1. Ahead of Paper Machines.
2. From deckers and washers at consistencies up to 20% without pumping the stock.
3. After blow pits and ahead of screening systems.
4. Ahead of and between stages in bleaching systems.
5. On pressure jordaning systems where our pressure type regulator mounts directly in the stock line.
6. On any application where either the consistency or quantity or both are to be regulated.

The DeZurik Regulator offers maximum simplicity, and most accurate results. It requires less attention because there are no bearings, pivots, lever joints, etc., which require cleaning and lubrication.

We are the largest builders of "Whole Volume Consistency Regulators."

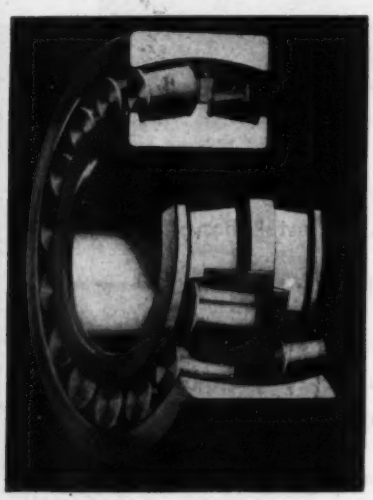
Write for the new 8-page regulator bulletin.

DeZurik Shower Company
Sartell, Minnesota

NEW EQUIPMENT AND SUPPLIES

Self-Aligning Spherical Roller Bearing

The Torrington Company, Bantam Bearings Division, South Bend 21, Ind., has announced a self-aligning spherical roller bearing for heavy-duty performance.

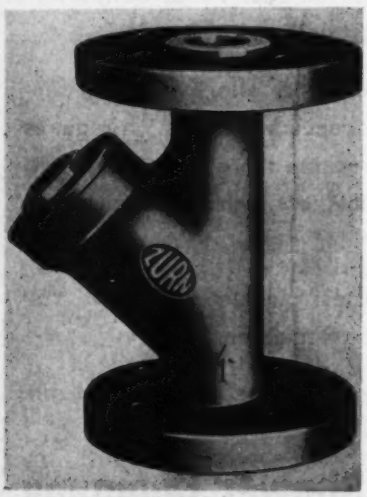


In addition to the self-aligning feature, the bearing offers two-directional thrust, high radial capacity, high thrust capacity, and unit construction.

The bearing will be produced in a full range of sizes from 1.5748 in. bore upward. It is suggested by the manufacturer for varied applications to machinery used in paper mills.

"Y" Strainer

A "Y" strainer, designed with a snug fitting strainer sleeve unit, has been announced by The J. A. Zurn Manufacturing Company, Erie, Pa. The strainer sleeve is removable, yet it cannot get out of place or vibrate when in use. When service conditions require it, the strainer basket is magnetized for intercepting metal particles.



The strainer is available with or without a cleanout plug, or can be furnished with a threaded blow-off connection. It is manufactured in cast bronze, steel, semisteel or cast iron; and in a wide range of sizes for flanged, welded or threaded connections.

Industrial Soldering Irons

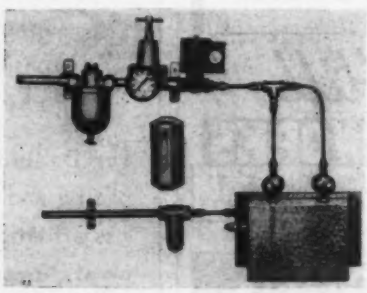
A new line of industrial soldering irons has been announced by the Industrial Heating Division of the General Electric Company, Schenectady, N. Y. The new irons range from 75 to 300 watts in size, and are available with tips from 3/8 in. to 1 1/4 in. in diameter.

Because of their quick recovery and high reserve-heat capacity, these irons permit soldering as fast and continuously as the character of the work allows. Calorized (surface-alloyed with aluminum) copper and 18-8 stainless steel are used for all parts subjected to high temperatures.

Other features of the irons include: Calrod heating units, either calorized copper tips or iron-clad copper tips, and plastic handles.

Industrial Humidifying Unit

Spraying Systems Co., 4021-23 W. Lake St., Chicago 24, Ill., has introduced a compact, industrial humidifying unit which is made in both two- and four-nozzle designs and with humidistat control. Siphon type humidifying nozzles are used. They utilize compressed air, mixed externally, and produce an exceedingly fine, round (full cone) spray.

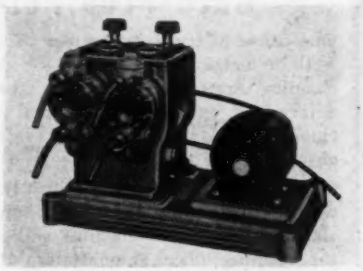


The nozzles can be set at various angles to increase efficiency of moisture distribution.

A complete two-nozzle unit is illustrated.

Chemical Proportioning Pump

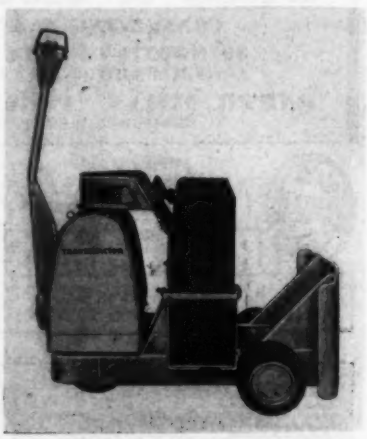
% Proportioneers, Inc. %, 132 Codding Street, Providence, R. I., has announced a new chemical diaphragm type proportioning pump—the Duplex DeLuxe Chem-O-Feeder. The pump is designed for the positive injection of one or two chemicals at predetermined and adjustable rates. The feeding rate of each chemical is individually adjustable for coarse variations by changing the stroking rate through a two-step cone pulley and belt arrangement. For fine variations, a stroke length adjustment knob on top of the



pump instantly varies the amount of solution fed per stroke. Transparent plastic reagent heads bare vital operating parts, such as diaphragms and check valves, to visual observation while the equipment is in operation. Also, each discharge stroke of the feeder is visible in sight feeder domes and any feeding irregularity may be detected. Moving parts inside the unit case operate in an oil bath.

Electric-Propelled Hand Tractor

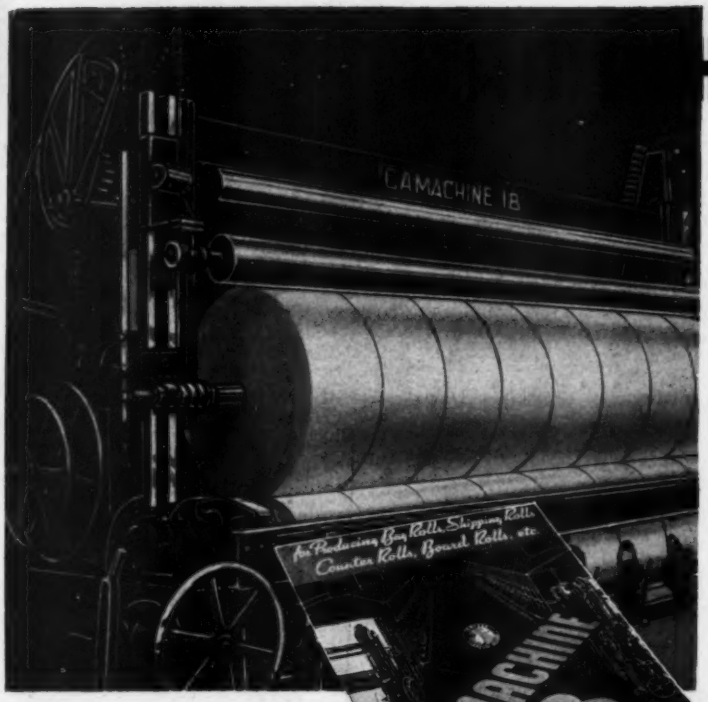
Automatic Transportation Company, Chicago, Ill. (a division of the Yale & Towne Manufacturing Company) has announced an electric-propelled hand tractor with front wheel drive. Known as the Transtractor, the tractor, depending upon



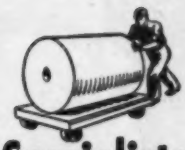
plant conditions, will push or pull a 6,000 lb. trailer load all day or up to 20,000 lb. intermittently.

Two forward and two reverse speeds are controlled by the angle of the guide handle. Likewise, drive brakes are applied by the return of the guide handle to upright position. This handle springs upward automatically when released.

Standard equipment includes a battery capable of eight to ten hours' operation, and a bumper plate for pushing. Accessories available include a portable cabinet, plug-in battery charging unit, and a coupler for towing operations.



HINE 18



Engineered by Specialists for Fast, Precision Winding

CAMACHINE 18 is largely used as the winding unit of paper machines and operates smoothly at speeds up to 2,000 F.P.M. in widths from 73" to 162"

In board mills and paper mills **CAMACHINE 18** will give good service either directly behind the paper or board machine or as a rewinder in the finishing room. When handling board it will run smoothly at speeds up to 1,200 F.P.M.

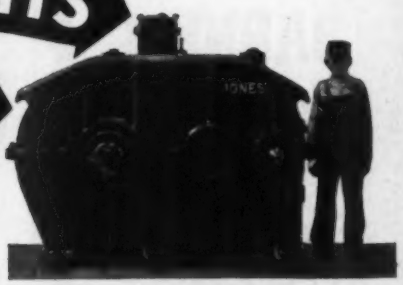
CAMACHINE 18 will keep ahead of the fastest paper or board machine. At whatever speed it may operate it produces perfect rolls with cleancut edges and uniform density from core to circumference. Among its features are automatic counterweighting of riding roller to insure uniform density throughout entire diameter, drum grooving to prevent wrinkles, easy threading, etc.

Simple in design and construction, **CAMACHINES** are noted for their dependability in daily operation year in and year out.

GET FACTS! WRITE FOR THIS FOLDER

CAMERON MACHINE COMPANY
61 POPLAR STREET, BROOKLYN 2, N. Y.
MIDWEST OFFICE 111 W. MONROE ST., CHICAGO 3, ILL.

Whether you need THIS —or THIS



You can get what you want in the complete range of Jones Herringbone Speed Reducers

YOU will find this 128-page catalog of Jones Herringbone Speed Reducers helpful in the selection of reducers in accordance with A.G.M.A. recommended practice for all conditions of service. Jones Herringbone Speed Reducers are built in single, double and triple reduction types and in every standard ratio in ratings ranging from 1.25 H.P. to 440 H.P.

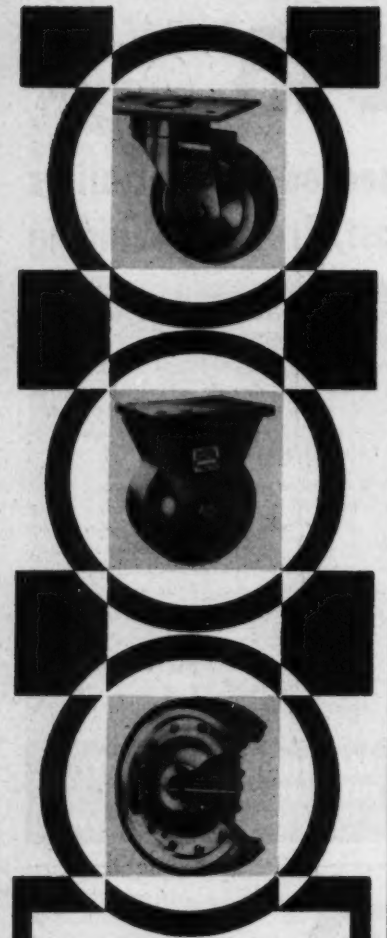
All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Liberal stocks are carried to facilitate shipments.

Catalog No. 70 will save you time and effort in laying out drives that call for Herringbone gears.

WRITE FOR YOUR FREE COPY

W. A. JONES FOUNDRY & MACHINE CO., 4439 Roosevelt Rd., Chicago, Ill.

Jones HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES



DARNELL CASTERS

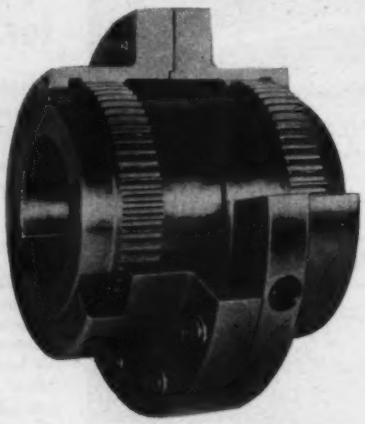
Built-in quality assures a long life of efficient service—it pays to "Demand Darnell Dependability".

FREE DARNELL MANUAL

DARNELL CORP. LTD.
LONG BEACH 4 CALIFORNIA
60 WALKER ST. NEW YORK 13, N.Y.
36 N. CLINTON CHICAGO 6 ILL.

Gear Type Coupling

John Waldron Corporation, New Brunswick, N. J., has announced a new "*Series A*" Gear Type Coupling. This coupling has been designed for a much larger maximum bore to permit use of smaller sized couplings than would ordinarily be required. Features of design include: all-



steel construction, made to close manufacturing tolerances, dust-proof, oil-tight, identical externally geared hubs that key to shafts, and enclosed by one-piece male and female sleeves that function as a single rigid unit.

The Waldron "Series A" Couplings are made in Standard, Heavy Duty, Marine, Mill Motor, Floating Shaft, Jordan, Shear Pin, Oil Collector and Cut-Out types.

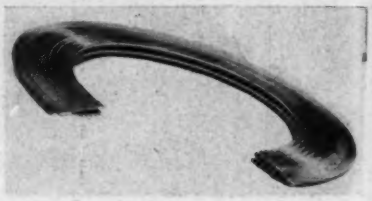
Pressure-Pull Indicator

George Rosales Company, 763 E. Ninth Street, Los Angeles 21, California, has announced the Joyro Pressure-Pull Indicator for determining pressure-pull of rollers in mechanical equipment. The indicator consists of a flat, watch spring steel

strip connected to a special tensionometer with a reading dial. According to the manufacturer, the indicator is simple to operate; also, it can be used to check pressure-pull across the entire length of a set of rollers simply by taking different readings at regularly spaced intervals.

Pressure-Sealed Gasket

Goetze Gasket & Packing Company, Inc., New Brunswick, N. J., has announced a serrated type gasket, the Bellowseal, which combines the pressure and corrosion resistant qualities of all-metal gaskets with the light bolting requirements of a softer sealing medium. The gasket consists of two discs of metal (Armco iron, low carbon steel, Monel, or stainless steel), machined on their external faces



with standard serrations and welded together around their outer periphery. Line pressure entering the interior of the gasket exerts expansion pressure in excess of the required sealing force.

Expendable Pallet

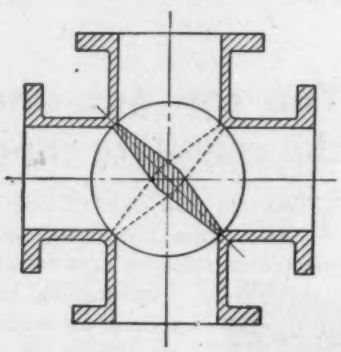
Techtmann Industries, 714 West Wisconsin Ave., Milwaukee, Wis., has announced a line of expendable pallets (patents pending) for use with fork-lift trucks. Utilizing a double corrugated board top supported on square or round wood blocks, the pallets, designated as

"X-P," are available in sizes and with block spacings to suit users' lift equipment. The entire top and block ends of the pallets are dipped in a water resistant adhesive.

The standard size unit is 42x48 in. This size of pallet has carried 4,000 lb. loads without failure.

Four-Way Transfer Valve

A single vane, quick-operating control valve, which can be manually or automatically operated, has been announced by



R-S Products Corporation, Wayne Junction, Philadelphia 44, Pennsylvania. The valve, suggested by the manufacturer for use in transferring chemicals, paper pulp, water, oil and other materials from one line to another, is equipped with adjustable stop screws and indicator to determine vane position. Fabricated from all types of metals, the valve can be made in sizes from four to 72 inches.

Here's the Reason--

CASH STANDARD *Streamlined* TYPE 1000 PRESSURE REDUCING VALVE

• Installation of this CASH STANDARD "1000" is a blow that knocks these trouble makers and cost raisers stiff and cold . . . permanently. When the CASH STANDARD "1000" goes to work, you immediately get good streamlined valve performance with good cost savings . . . for years.

Maximum Capacity When Needed Most • Accurate Pressure Control Under Toughest Working Conditions Trouble-Free Service • Smooth Operation • Tight Closure • Accurate Regulation • Speedier Production Results • Elimination of Failures • Constant Delivery Pressure • Cost Saving Operation • No Spoilage • Practically Zero in Maintenance Costs

CASH STANDARD CONTROLS . . . VALVES

Send for a copy of Bulletin 962

A. W. CASH COMPANY
DECATUR, ILLINOIS

PARIS 2

The BLACK *for* PAPER

• A COLUMBIAN COLLOID •

Especially created to overcome dispersion problems, Paris 2 is the easiest wetting black in the paper field.

- ✔ Free from oiliness
- ✔ Optimum particle size
- ✔ High tinting strength
- ✔ Uniformity
- ✔ Ease of dispersion

Use

PARIS 2 BLACK for JET BLACK PAPERS or GRAY-TINTED STOCKS

Technical Inquiry Is Invited

COLUMBIAN CARBON CO. MANUFACTURER • BINNEY & SMITH CO. DISTRIBUTOR

41 EAST 42nd STREET • NEW YORK 17, N. Y.

TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Evaluation of Sulphite Pulp From the Papermaker's Viewpoint

The necessity of a closer co-operation between the pulp manufacturer, the papermaker and the printer is stressed, with a view towards the improvement of the sheet. The discussion relates more particularly to high grade boxboards, on which the printing may entail some 10 different colors. Moreover good printing qualities are not the only essential requirements, because the board may have to undergo embossing, folding, creasing, etc.

The more important properties that are expected in a suitable unbleached pulp are: absence of impurities and resinous materials, the highest possible degree of whiteness, and uniform strength properties as evaluated by procedures accepted as standard by all the pulp mills. In the case of bleached pulps, more dependable techniques for measuring the degree of whiteness are to be desired. Pitch troubles are discussed at some length together with the resulting difficulties experienced in paper mills and conversion plants. Evidently an important analytical determination is that of the so-called dichloromethane extract. The magnitude of this is an index as to whether or not pitch troubles may be expected from the pulps in subsequent operations. Whenever this extractive exceeded 1%, trouble might be expected.

Prior to the war, Swedish pulp mills ordinarily delivered resin-free pulp, but during the war period nearly all pulps contained pitch and gave rise to pitch difficulties. A possible explanation was that the mills no longer stored their wood, but used almost exclusively green wood. Furthermore, the time of cutting had changed from a definite schedule to any time at which manpower was available. A study of the effect of the cutting season on pitch troubles is suggested. The pitch troubles depend on the type of resinous material present, the latter also depending on the storage conditions, the composition of the cooking liquor, and on the techniques used in the digestion, especially on relief and withdrawal of the liquor.

"Rough-barked" wood is less desirable than is wood that has been completely barked, because the oxidation of the rosin (in partly barked wood) cannot progress rapidly enough during the short storage periods (used during the war). Furthermore, the well-barked wood naturally gives a cleaner pulp. When using unbleached sulphite pulp, the condition of the raw material entering the digester is of prime importance. Sapwood of a rough-barked bolt impairs the uniformity of cooking and leads to poorer quality due to lack of cleanliness. Furthermore, rough-barked wood may contain more tannins than are present in well-barked wood. Tannic acid may precipitate iron in the mill water and may thus be responsible for a blue tint that occurs in certain pulps (at least that is the suggestion made by the author).

The fact remains, however, that tests alone are insufficient to evaluate the future behavior of a pulp during a specific conversion, nor do they give full information regarding its suitability for that purpose. The only safe test is to use the pulp under operating conditions. To make tests comparable, it is advisable to beat pulps to the same degree Schopper-Riegler—for example to 45 deg. S. R. The Lampen mill is not suited to this purpose and this lack is illustrated by specific examples. The author also suggests that the degree of beating be standardized in making whiteness measurements. Martin Martinson. Svensk Papperstidn. 48, No. 15, 369-75 (1945), through B. I. P. C. 16, 127-8 (1945). (The original article is in Swedish but summaries are given in English and German).

Chestnut Pulp

Three French mills use spent chestnut shavings for tanning operations and then use the residue for soda pulp. It is utilized advantageously in connection with long fibered coniferous pulps for fine writing and printing paper. Chestnut pulp takes printing ink readily and may be used for engraving, offset, helio, or other printing processes. It imparts a dense opaque surface to the paper. Because of the excellent absorbent properties of the pulp it may also be employed in blotting paper and all unsized sheets in which absorbency is desirable. When properly purified it gives a high alpha pulp suitable for rayon. Anon. World's Paper Trade Rev. 125, No. 1, Technical Supplement 4 (Jan. 4, 1946) through B.I.P.C. 16,328 (1946).

Diffuser Washing of Sulphate Pulps

The diffuser used by the author for washing sulphate pulps was of 30 cubic meter capacity, and the more important results of a series of studies are reported. The pressure of the wash waters should be sufficiently high to allow a pressure differential of 1.5 to 2 kg. per sq. cm. Although a low water pressure will reduce the total washing period, the dilution of the displaced liquor becomes less favorable for evaporation. Too high a wash-water pressure may result in packing the pulp too tightly, thus impairing washing efficiency. In general the best temperature for washing is about 50 C. If the washing procedure must be speeded up, (because an insufficient number of diffusers is available) time may be saved by using hot water. This however places an increased burden on the evaporators, because dilution of the waste waters increases at the higher temperatures. The influence of the degree of cooking on the washing efficiency is marked.

In general, hard pulps should not be handled, particularly when the capacity of the diffuser room is limited. With central blowing and when the pulp is blown from an angle from digester to diffuser, a non-uniform packing of the diffuser may take place. Uniformity of packing is essential in obtaining uniform displacement of the liquor everywhere in the diffuser.

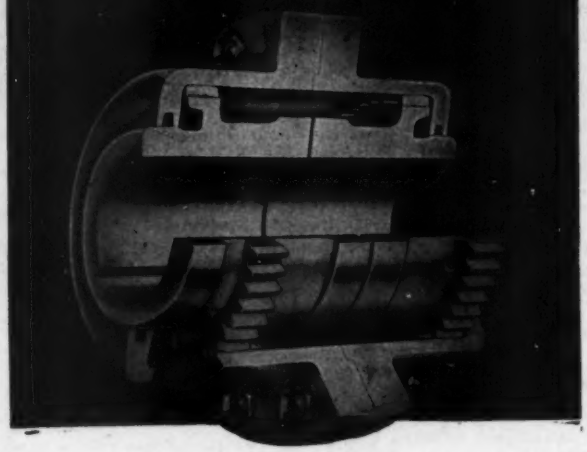
The diffuser used in the present investigation was so constructed that it worked better for central blowing. The area of the bottom screen plate and the shape of the diffuser may influence the results of washing to a marked degree. This must be taken into consideration in judging the results of the present experimental data when similar tests are made with differently constructed diffusers. Corrosion of the diffuser walls increases with higher rates of flow of the wash water. This may be prevented by coating the inside walls with a thin layer of cement. Diagrams and graphs are included. (The original is in Swedish with English and German summaries). Carl B. Björkman. Svensk Papperstidn. 49, No. 2, 27-33 (1946) through B. I. P. C. 16, 354 (1946).

Mechanism of Paper Manufacture From Straw Digestion

In France certain types of pulp are made by soaking clean straw in milk of lime. After 4 days to a week, during which the temperature rises to 70 C. due to fermentation, the liquors are drawn off, and the straw is rinsed and then used to cover a fresh batch of straw. At the end of another 4-8 days, the top layer is removed and is then utilized in the manufacture of paper pulp, whereas the lower layer is used to cover a fresh batch of straw. The fermentation is accompanied by the formation of strong odors of butyric acid, and spoilage, by rotting, occurs frequently.

The analyses of the original and the treated straws indicate that the only significant change appears to be the removal of all the acetic acid groups (probably from the holocellulose) and in the ash content. On the other hand when the straw is soaked in enough lime water to maintain a pH of 11, and the temperature is kept at about 40 degrees, or less, a usable pulp is obtained in four days and the objectionable fermentation is dispensed with. The pulp yields are of the order of 90%. Gradually, the lime liquors, on reuse build up enough acetate of lime to be a commercial source of this chemical. Data are given for sheets prepared from such pulps. Gabriel Bertrand and Jean Delga. Compt. rend. 220,805-7 (1945), through C. A. 40, 2300 (1946).

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY — WOODBERRY, BALTIMORE, MD.

P.M. 32 POWDER

Bactericide and Fungicide

ODORLESS—NON-CORROSIVE—SAFE

CONTROLS SLIME

Only ½ to 1 ounce of this powerful disinfectant per ton of stock, dry basis, is usually sufficient to control slime-forming micro-organisms in a pulp or paper system.

FALLS CHEMICAL PRODUCTS COMPANY

OCONTO FALLS, WISCONSIN

JONES STOCK PREPARATION MACHINERY

Jones-Bertrams Beater	Stock Chests
Standard Beating Engines	Agitating Equipment
Jordans	Paper Machine Screens
Refiners	Pulpers, Disintegrators
Banded and Bandless Jordan Plugs	Dusters of All Kinds
Beater Rolls	Beater and Jordan Fillings
Washing, Bleaching Engines	Teale Flexible Slices

E. D. JONES & SONS COMPANY • PITTSFIELD, MASS.

Over 100,000 Supplied to Industry

THE JOHNSON *Rotary Pressure* **JOINT**

Johnson Corporation

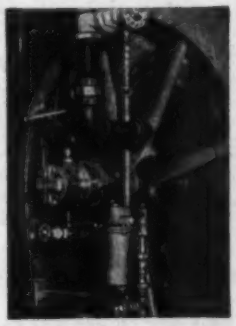
845 Wood St., Three Rivers, Michigan.

- Completely Packless
- Self Oiling
- Self Adjusting
- Will absorb both lateral and angular misalignment

INCREASE PRODUCTION

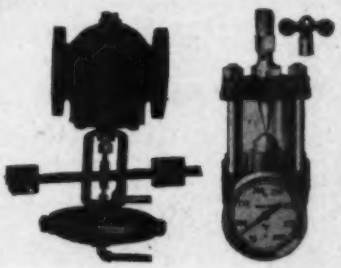
. . . Save Steam, Save Fuel, Improve Quality

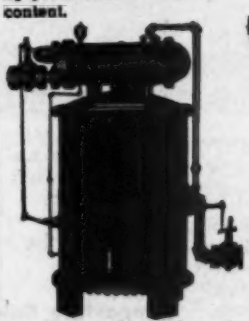
● Stickle Drainage and Control permits paper machines to be operated at, or near, potential capacities, and to produce a superior quality of product. Stickle Equipment reduces the amount of steam used, increases boiler capacities, and cuts fuel costs. Correct drainage at all pressures. Uniform drying at desired moisture content. Installations adapt system to requirements of operating conditions.



Individual dryer drainage (at top), or Differential Drainage (above), recommended according to operating requirements. Either type of drainage may be combined with Pumping Unit for returning condensate to boilers or feed water heater with minimum temperture loss. Fuel consumption reduced. Boiler capacity increased.

Stickle Tension and Thermal Control automatically retards or accelerates steam flow according to need of sheet established by predetermined moisture content.





Automatic Differential Valve provides exact differential in pressure between two sections of machine, insuring proper drainage at all pressures. Micro Adjustable Orifice (with or without thermometer) supplies visible operation of syphons. Open Coil Feed Water Heaters in capacities to meet all needs.

For complete information and data on Stickle Systems for Paper Mills, and the individual specialties composing them, ask for Bulletin No. 160.

STICKLE

STEAM SPECIALTIES COMPANY

2215 Valley Ave., INDIANAPOLIS 1, INDIANA

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Paper Coating Composition and Method of Making

Patent No. 2,369,427. Eugene G. Bennett, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. No Drawing. Application October 23, 1940. Serial No. 362,459. 8 Claims. (Cl. 106—148).

1. Process of preparing coating compositions which comprises mixing together protein adhesive selected from the class consisting of casein and soybean, mineral pigment, water, an aldehyde capable of causing an aqueous composition at room temperature having a pH of 9.5 and consisting of casein 15 parts, coating clay 100 parts and water 170 parts to set to a substantially solid gel within 30 minutes when added to the mixture in amount of 3% of the casein, another aldehyde being incapable of producing a marked thickening of the composition when similarly tested the quantity of the first-named aldehyde being sufficient to cause a gelling of the coating in the absence of the second-named aldehyde, and the quantity of the second-named aldehyde being sufficient to retard the gelling action of the first-named aldehyde, and an alkaline compound sufficient to give the coating composition a pH of from 9.0 to about 11, the order of addition of the ingredients being such that the second-named aldehyde is present before the composition contains the mixture of protein adhesive, the first-named aldehyde and alkali, and thereafter heating the composition to a least 150° F. to improve the ink resisting properties thereof.

Process of Bleaching Pulp

Patent No. 2,377,171. Harold R. Murdock, Asheville, and Walter Phalti Lawrence, Canton, N. C., assignors to The Champion Paper and Fibre Company, Canton, N. C., a corporation of Ohio. No Drawing. Application September 28, 1940, Serial No. 358,936. 9 Claims. (Cl. 8—105).

1. Process of bleaching kraft pulp, which comprises subjecting raw kraft pulp to a multi-stage bleaching operation, removing water from the resulting at least partially bleached pulp by mechanical means and by evaporation, to a condition of at least 70% air dry thereafter disintegrating the dried pulp in water, and bleaching it with a composition containing a chlorite and an activator therefor to a brightness of at least 80.

Paper Machine Cleaner

Patent No. 2,366,354. Douglas R. Robbins, Middletown, Ohio, assignor to Douglas Robbins and Company, Middletown, Ohio, a firm. Application October 15, 1940, Serial No. 361,297. 2 Claims. (Cl. 92—50).

1. In combination with the reciprocating pipe of a screen cleaner in paper machines, a series of spray elements comprising plug portions threaded into the pipe and having a small bore opening into the pipe, a communicating body portion having an expanded bore, said latter portion having air openings therein, said expanded bore portion communicating with a restricted bore portion providing a jet opening, said spray elements spaced at intervals along the pipe based on the reciprocation range thereof so as to obtain complete coverage of the screen to be cleaned.

Process of Coating Paper

Patent No. 2,331,922. William J. Montgomery, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. No Drawing. Application August 3, 1940, Serial No. 351,218. 13 Claims. (Cl. 117—64).

9. Process of making coated paper having a non-cast surface, which comprises applying fluid aqueous coating composition comprising adhesive, mineral filler and an insoluble soap to a web of paper, pressing the coated side of the paper while the coating is wet, against a solid surface carrying thereon a liquid film which is substantially immiscible with said fluid coating composition, and separating the web from said surface after the coating composition has at least partially dried to form a firm layer.

Method of Coating Paper

Patent No. 2,375,360. Walter W. Herrick, Milford, N. J., assignor to Riegel Paper Corporation, New York, N. Y., a corporation of New Jersey. Application April 3, 1942, Serial No. 437,573. 6 Claims. (Cl. 117—64).

1. The herein described method which comprises maintaining a molten bath of bismuth, tin and cadmium in a container, maintaining a layer of high melting point wax on the top of the bath at the inlet end of the container, and passing a web through the layer of wax and the molten bath whereby a coating of wax is first applied to the web and the coating then levelled as the web passes through the molten bath.

Imparting Color to Coated Paperboard

Patent No. 2,370,344. Harry C. Fisher, Cincinnati, Ohio, assignor, by mesne assignments, to Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis., a corporation of Wisconsin. Application September 29, 1941. Serial No. 412,831. 3 Claims. (Cl. 8—7).

3. In a process for preparing a uniformly colored mineral coated paper web, the steps which consist in first imposing on the web a moist composition composed of an adherent water soluble size and water soluble dye, as the essential coloring component thereof, and then as a part of a continuous treatment and before the size is dried, mineral coating the web with an aqueous vehicle mineral pigment coating mixture wherein the mineral pigment is the essential coloring component and of contrasting color to said dye, with the result that the dye is absorbed from the size into the final mineral coating to impart its color thereto and to thereby uniformly modify and alter the color of the mineral coating.

Sampling Method

Patent No. 2,374,847. Joseph P. Vollrath, Glenside, Pa., assignor to The Brown Instrument Company, Philadelphia, Pa., a corporation of Pennsylvania. Application November 7, 1941, Serial No. 418,185. 2 Claims. (Cl. 73—421).

1. The method of obtaining a sample of a traveling web from any desired portion of its width which comprises the steps of simultaneously cutting a pair of parallel slits in the web in a direction opposite to the direction of web travel maintaining said slits parallel to the edges of the web for a suitable time, slowly directing said slits toward an edge of the web until the edge is cut, and removing the strip of web from between said slits.

Manufacture of a Pigment Paste From the Water Pulp Color

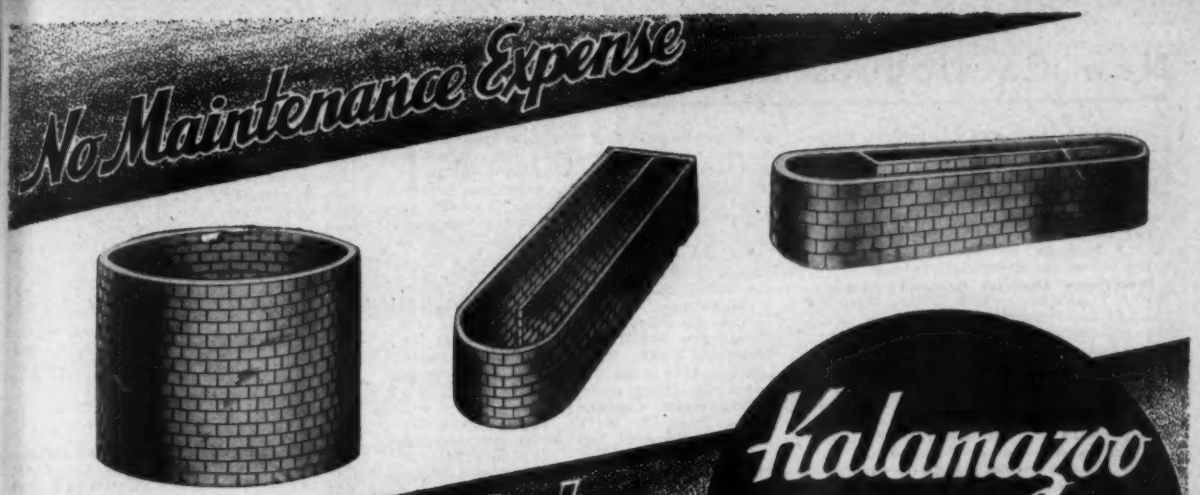
Patent No. 2,378,786. Clare Alexander Osborne, Toronto, Ontario, Canada. Application February 27, 1942, Serial No. 432,682. 11 Claims. (Cl. 106—309).

1. Continuous method of producing a pigment paste directly from a moist water pulp color in one general stage of operation which comprises forming an emulsion of a water pulp color and a film forming material, coating said emulsion thinly upon a moving surface, subjecting said coating to a heat treatment to drive off the water constituent of the emulsion, and collecting the residual pigment paste from said moving surface.

Manufacture of Anti-oxygenic Paper

Patent No. 2,377,359. Sidney Musher, New York, N. Y., assignor to Musher Foundation Incorporated, New York, N. Y., a corporation of New York. No drawing. Application August 5, 1940, Serial No. 351,547. 6 Claims. (Cl. 92—21).

3. In the method of making antioxygenic paper the steps of providing paper pulp with a pH of between 4 and 6.9, adding to the paper pulp a small amount, less than 1%, of an aromatic compound while maintaining a pH between 4 and 6.9, and then compacting the paper pulp at a temperature of at least 210° F. to cause a reaction between the aromatic compound and the paper pulp and to form the antioxygenic paper, said aromatic compound being selected from the group consisting of hydroquinone, guaiacol, phloroglucinol, resorcinol, pyrogallol, pyrocatechol, tri butyl catechol, and vanillin.



Uninterrupted Production

ANY SIZE or SHAPE
COMPLETE ERECTION SERVICE

Kalamazoo GLAZED TILE Tanks and Chests

KALAMAZOO TANK & SILO CO., Kalamazoo, Michigan

TRADE MARK MURCO REG. U.S. PAT. OFF.

This TRADEMARK

Means dependable engineering design and manufacturing of equipment for the pulp and paper mill industry . . .

D. J. MURRAY MANUFACTURING CO.
WAUSAU · WISCONSIN

COLORS . . .
for Board and Paper

Green Chromium Oxides
Black, Brown, Red, Yellow Iron Oxides
Lamp Black—Umbers—Venetian Reds—Yellow Ochres

C. K. WILLIAMS & CO.
Easton, Pennsylvania

CHEMIPULP PROCESS INC.
CHEMICAL PULP MILL ENGINEERS
500 Woolworth Building, Watertown, N. Y.
3311 First Avenue South, Seattle, Wash.
Associated with CHEMIPULP PROCESS LIMITED, Montreal, Que.

TRIMBEY MACHINE WORKS
GLENS FALLS N.Y.
PULP SCREENS
WEIGHT AND CONSISTENCY REGULATORS
METERING SYSTEMS · FLOAT VALVES

New Catalogues and Publications

American Car and Foundry Company, New York, N. Y.—In an eight-page pamphlet, ACF Full Pipe-Area Lubricated Plug Valves are described. The valves are for use in piping acids, caustics, chemicals, oil, water, and other fluids. The pamphlet gives efficiency ratings for the piping operations using the described valves.

American District Steam Company, North Tonawanda, New York—Bulletin No. 46-50 illustrates and catalogues the complete line of ADSCO Strainers and Separators. List prices as well as dimensions and other data are given on Y type strainers, the T type strainers large pipe line Macomb type strainers for oil and water, horizontal and vertical separators for steam, air or gas service, and receiver separators for various installation conditions.

The American Flexible Coupling Company, Division of J. A. Zurn Mfg. Co., Erie Trust Bldg., Erie, Pa.—Catalogue No. 461 just published reports on the characteristics, installation, and operation of the flexible couplings manufactured by American. Engineering data concerning the operation of the couplings is also charted.

Automatic Transportation Company, 149 West 87th St., Chicago 20, Ill.—Answers to technical questions on the operation and construction of Automatic electric propelled fork lift trucks are given in a series of brochures released recently. Technical data included in the booklets gives a summary of the operating characteristics of motorized material handling equipment with capacities of 2, 3, 4, 5, and 6 thousand pounds.

Beaver Pipe Tools, Inc., Warren, Ohio—A condensed catalogue covering the complete line of Beaver pipe tools has been released. Descriptions of the tools and specifications are listed together with cost features of the equipment.

Carver Pump Company, Muscatine, Iowa—A new line of centrifugal pumps ranging in capacity from 40 to 900 gpm and heads up to 200 feet are described in a recent bulletin. Details of hydraulic design which makes for higher efficiency are included.

Chain Belt Company, 1600 W. Bruce St., Milwaukee 4, Wis.—Bulletin No. 463 is devoted to the proper selection of idlers, contains cross-sectional views showing construction details of Rex Idlers, describes the complete line of standard idlers, and covers the special application of idlers. Also included in the booklet are illustrations of the latest Rex Idlers, the Impact Cushioning Troughing Idler and the Rubber Covered Spiral Return Idler.

Clark Tructractor, Division of Clark Equipment Co., Battle Creek, Mich.—The Clark "Truckloader" is described in the latest issue of the Material Handling News. Photographs and detailed descriptive matter relating to the Truckloader are contained in the booklet. The material handling capacity of the Truckloader is also described.

Copper Alloy Foundry Company, Hillside, N. J.—This recent release of Copper Alloy compiled by their chief metallurgist is a complete hand book on corrosion and heat resisting products produced by Copper Alloy. The book is supplied with index guides having subject tabs.

Fischer & Porter Company, Hatboro Pa.—In catalogue section 31-E the small size low cost Rotameter which has been specifically developed for purge line service is outlined. The meter which gives accurate, precise flow rate measurement with minimum space requirements can be mounted on panels.

The Griscom Russell Company, 285 Madison Ave., New York 17, N. Y.—A condensed and self indexed bulletin on heat transfer apparatus for chemical process industries has just been published. The bulletin describes more than twenty different types of evaporators, heaters, coolers, condensers and heat exchangers for liquids, vapors, and gases. The index tables gives ready reference to units suitable for handling specific fluids.

Hardinge Company, Incorporated, York, Pa.—Thickening, clarifying, and agitating equipment are covered in Bulletin 31-D. Two tables are included which give data on specific thickening and clarifying operations.

Hayward Company, 50 Church St., New York 7, N. Y.—Suggestions for the handling of pulpwood are covered in Bulletin No. 802. The information concerns the use of the Hayward grapple devices.

Hercules Powder Company, Wilmington, Del.—A complete catalogue of chemicals for use in industry has been issued by this company. Among the industries served, many applications for chemicals in the paper industry are listed. For easy reference, the products are first indexed according to various industries in which the chemicals are used and then according to chemical families.

Lewis-Shephard Products Incorporated, 279 Walnut St., Watertown 72, Mass. — In a circular 80-112, floor trucks, life trucks, power fork trucks, pallet stackers, and equipment for handling materials are described and catalogued.

Massey Machine Company, Watertown, N. Y.—Bulletin HT-46 catalogues the new line of Massey hand trucks. Details of the features of the equipment handling devices are included.

Mercury Manufacturing Company, 4102 S. Halsted St., Chicago 9, Ill.—A pocket size reference booklet released by Mercury catalogues and the company's line of tractors, trailers, and lift trucks. The latest type of telescopic lift equipment is described together with expanded lines of materials handling equipment.

Mine Safety Appliance Company, Pittsburgh, Pa.—An industrial gas mask for protection against smoke, vapors, gases, and dusts is described in a new bulletin. Special feature of the mask is the all vision face piece which allows unobstructed vision. The face piece is available with a speaking diaphragm which insures communication.

Northern Equipment Company, Erie, Pa.—Controlling Water Level on Combustion Engineering Type VU Boiler is the subject of the Northern booklet just released . The detail of operation and maintenance problems encountered are described.

Norton Company, Worcester 6, Mass. The problems associated with roll grinding are treated in detail in a new Norton pocket-size booklet. The subject of grinding paper-mill rolls, discussed with respect to surface and finish requirements, the importance of correct crown shape, and the equipment used in grinding the rolls, together with tips on grinding rubber-covered rolls are considered with respect to associated problems.

Smith and Winchester Manufacturing Company, South Windham, Conn.—Model "E" Undercut Trimmer is the title of a new bulletin just issued specializing in automatic paper cutting and trimming machine manufacture. The design construction of the undercut trimmer and its performance in paper mills are discussed.

Tweco Products Company, Wichita 7, Kan.—In the 1946 TWECOLOG the cable splicers manufactured by this company are catalogued in detail. The features of the maintenance devices which insure quick repair of broken cables are included.

Warren Steam Pump Company, Inc., Warren, Mass.—Bulletin 230 gives complete information on the mechanical features, metal specifications, sizes, capacities, and dimensions of the Warren horizontal duplex piston pumps, realwear type. Automatic pumps and receivers are illustrated and described.

Westinghouse Electric Corporation, Pittsburgh 30, Pa.—In booklet B-2658 preventative maintenance techniques designed to insure efficient operation of industrial electronic equipment are outlined. The six basic maintenance operations, cleaning, inspection, feeling, tightening, adjusting, and lubricating are described in relation to various electronic devices.

Books

The Paper Year Book (1946 Edition)—This volume constitutes the fourth annual edition of the publication. Published by the Davidson Publishing Company, 22 East Huron St., Chicago 11, Illinois, and edited by Anita Reinig and staff, the book furnishes basic information on a wide variety of papers, paper products and related items together with other statistical data, charts, and tables relating to the paper industry.

Organized into six major sections—alphabetical index to products, paper and paper products data, paper markets, useful data for salesmen, manufacturers' addresses, and index to advertisers, the book contains 532 pages, over 600 illustrations, and more than 100 charts and tables. It is priced at $7.50 a copy direct from the publisher.

Flow Meter Engineering Handbook (Second Edition)—Compiled and edited by Louis Gess and R. D. Irwin, this handbook gives information on orifice coefficients, flow calculations, and general flow meter engineering. Separate chapters are devoted to compressibility of gases, orifice calculations for various fluids, and the application of correction factors.

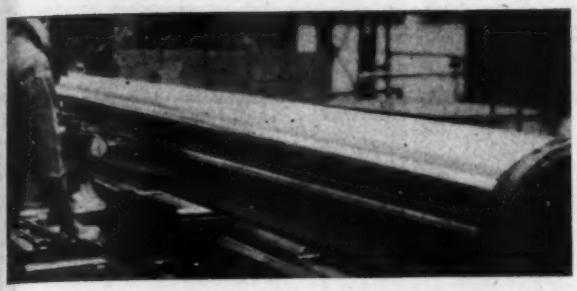
The first chapter discusses principles of orifice meter measurement. It is followed by chapters on the crifice plate and differential connections, design details of Brown flow meters, flow approximation tables, derivations of working formula, working equations, compressibility of gases, relationship between coefficient of discharge, viscosity of fluids, and orifice calculations for steam, water, oil and gas flow.

The final chapters are given over to a summary of equations and nomenclature, changes for corrections in operating conditions, and volume computations.

Included in the text are 38 figures and 55 tables. The book totals 151 pages.

Published by The Brown Instrument Company, Philadelphia, Pa., the book is priced at $2.50 a copy.

How To Improve Employee Discipline—Prepared as a special report for management, this paper-covered booklet explains the steps to be taken to insure lasting and equitable "tightening up" of discipline. These steps may be summarized as follows: set up written rules and regulations; make them reasonable; formalize the penalties; distinguish between major and minor offenses, so that punishment may fit the crime; publicize the rules to employees, foremen, and executives; use printed warning forms to notify offenders after each infraction—keep a record of such warnings; and train supervisors to investigate every situation thoroughly before imposing a penalty. A series of charts and check lists supplement the text material. Published by Labor Relations Institute, 1776 Broadway., New York 19, N. Y., the booklet is priced at $1.75 a copy.



The Chief Speaks

Re-cover your present rolls with Chief Sandusky Centrifugally Cast bronze roll covers.

The fine uniform grain structure and accurate machining have resulted in Sandusky Centrifugal Castings being specified by the machine builders for years.

Sandusky Centrifugal Castings are also being used for applications such as pump liners, digester sleeves and bearing liners.

Discuss your requirements with your machine builder.

CHIEF SANDUSKY *CENTRIFUGAL CASTINGS*

SANDUSKY FOUNDRY AND MACHINE CO. SANDUSKY OHIO, U.S.A.

GEORGE F. HARDY

Consulting Engineer to the Paper Industry since 1900
441 Lexington Avenue, New York 17, N. Y.
MEMBER—AM. SOC. C. E.—AM. SOC. M. E.—ENG. INST. CAN.

Consultation	*Paper and Pulp Mills*
Reports	*Hydro-Electric and*
Valuations	*Steam Power Plants*
Estimates	*Plans and Specifications*

Read . . .

THE PAPER INDUSTRY AND PAPER WORLD

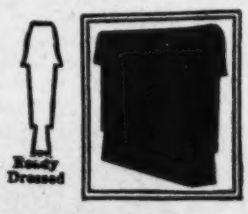
for

Constructive Articles—Selected News—Features

"READY DRESSED" MILL COGS

LABOR SAVING—TIME SAVING

The Most Economical Filling That Can Be Put in a Mortise Wheel.



Ready Dressed

Blank Head

We Make Any Style or Size Wanted.

Write for Instruction Sheet "O" Which is Free.

QUICK SERVICE ON ALL SIZES

THE N. P. BOWSHER CO., South Bend, Ind.

Gain **PAPER PRODUCTION HOURS** *with*

BOWSER PAPER MILL LUBRICATION SYSTEM

BOWSER ESTABLISHED 1885

LUBRICATING SYSTEMS

Bowser lubricating systems help paper machines to stay on the job . . . twenty-four hours a day . . . by providing a constant supply of clean oil to every bearing. This efficiency and dependability have served the paper industry profitably for more than fifty years by reducing wear and downtime . . . by keeping production on schedule.

A Bowser lubrication engineer will be glad to call . . . at your convenience . . . to discuss lubricating equipment for any paper mill need. For reliable lubrication counsel, call Bowser.

BOWSER, INC.

1315 Creighton Avenue, Fort Wayne 2, Ind.

LIQUID CONTROL SPECIALISTS SINCE 1885

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	–5.50
Corduroy, Men's	–3.50
Corduroy, Ladies'	–3.00
Washables, No. 1	–3.00
Percales	–4.75
New Soft Blacks	–3.75
Light Prints, No. 1	–4.50
Khaki Cuttings—	
Bleachable	–4.25
Unbleachable	–3.50
New White Canvas	–6.50
New Mixed Blacks	–3.25
Canton Flannels, Bleached	–7.00
Shirt Cuttings—	
New White No. 1	–7.25
No. 1 White Headings	–7.25
White Shrunk	–5.00
Silesias No. 1	–5.75
New Unbleached	–7.50
Fancy	–3.50
Linen Cuttings—	
American	–5.00
White	–14.00
Grey	–14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowance of $1 to $2 a ton depending on the value of the grade involved.

Roofing	per ton
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
White, No. 2—	
Repacked	58.00
Miscellaneous	52.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shepperies	

ROPE and BAGGING

f. o. b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	$4.25 to 4.50
Wool Tares—	per cwt.
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	–*115.00
No. 1 small	–*105.00
Sisal Rope—	
No. 1 large	–*95.00
No. 1 small	–*80.00
New Burlap Cuttings	6.00 to 6.25
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	–*80.00
No. 2 sisal	–*60.00
Soft jute	5.00 to 5.50
Mixed	2.00 to 2.25

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment for machine compressed bales weighing not less than 500 pounds (with differential of $5 per ton less on certain grades for loose or bundled stock), and brokers' allowance of 4 to 9 per cent.

Shavings—	per ton
White Env. Cuts, One-Cut	67.50–
Hard White Env. Cuts	62.50–
Hard White, No. 1	57.50–
Soft White, No. 1	50.00–
Soft White, One-Cut	57.50–
Soft White, Misc.	43.00–
Fly Leaf, No. 1	32.50–
Fly Leaf, Woody, No. 1	25.00–
No. 2 Mixed Col. Woody	18.00–
Flat Stock—	
No. 1 Heavy Books and Magazines	38.50–
Mixed Books	22.00–
Ledger Stock—	
No. 1 White	48.00–
No. 1 Mixed (Colored)	40.00–
Manilas—	
New Env. Cuttings	53.00–
New Env. Cuts, One-Cut	57.50–
Extra Manilas	39.00–
Manila Tab Cards, Free of Ground Wood	45.00–
Ground Wood Manila Tab Cards	27.00–
Kraft—	
Envelope Cuttings	65.00–
Mixed Env. or Bag Cuts	55.00–
Tripled Sorted No. 1 Brown	50.00–
New 100% Cor. Cuts	45.00–
No. 1 Old Assorted	35.00–
News—	
White Blank	33.00–
Overissue	22.00–
No. 1 Baled	20.00–
Old Corrugated Containers	28.00–
New Corrugated Cuts	18.00–
Mill Wrappers	22.00–
Box Board Chips	14.50–
No. 1 Mixed Paper	19.00–

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25–
Ground, cwt.	4.00–
Powdered, cwt.	4.40–
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to —
Bleaching Powder—	
Drums, cwt.	2.25 to 3.10
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	33.00 to 33.75
80-100 mesh (bags), lb.	—
Argentine, lb.	39.00 to 40.00
China Clay—	
Domestic Filler Bulk (mine) ton	8.00 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	22.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	17.25 to 17.75
Litharge, powd., bbl., lb.	.08 to .09
Rosin (Gum)—	
New York, per 100 lbs.	
E	7.42–
F	7.42–
G	7.62–
WW	7.82–
Rosin (Wood), carlots	4.50–
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	20.00 to —
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30–
Ground and flake, drums, cwt.	2.70 to 2.95
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 55 gal. drums, (works) cwt.	.30 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.72–
Pearl, barrels, cwt.	3.83–
Paper (Sp.) bags, cwt.	3.83–
barrels, cwt.	3.92–
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to —
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 25.00
Canadian	24.00 to 30.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¾
Zinc Sulphide, bbls., lb.	5.60 to 6.10

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	94.00
Unbleached softwood sulphite	82.00
Bleached hardwood sulphite	91.50
Unbleached hardwood sulphite	79.50
Northern bleached sulphate	94.00
Southern bleached sulphate	88.00
Northern semi-bleached sulphate	80.00
Southern semi-bleached sulphate	83.00
Northern unbleached sulphate	76.00
Southern unbleached sulphate	69.50
Bleached soda	84.00
Unbleached soda	80.00
Ground wood pulp	58.00
Ground wood—paper machine dried and mutilated	61.00
Sulphite screenings	45.50
Sulphate screenings	40.00
Ground wood screenings	34.00
Northern unbleached sulphate sideruns	76.00
Southern unbleached sulphate sideruns	69.50
Standard news print sideruns	58.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	90.00–
Chip	54.00–
Chip, tube and can	58.00–
Chip, full-blending	58.50–
Chip, sgl. mla. lined	65.00–
Coated, white patent .016	84.00–
.020 and heavier	79.00–
Kraft liner	63.00–
News	54.00–
Container	54.00 to 56.50

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	9.35
B Grade E. F.	8.85
C Grade E. F.	8.55
D Grade E. F.	8.25
No. 2 Uncoated Offset 4 sides, White	8.45

Coated White (Trimmed 4 sides)

No. 1 Glossy	13.65
No. 2 Glossy	12.40
No. 3 Glossy	11.60
No. 4 Glossy	11.15
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt.	
	20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	28.00	28.00
75% Rag	20.00	20.00
50% Rag	16.00	17.25
25% Rag	14.00	15.00

Rag Content Ledger—	per cwt.
	Zone 1
Extra 100% Rag	35.00
100% Rag	29.00
85% Rag	26.00
75% Rag	21.00
50% Rag	17.00
25% Rag	15.00

Sulphite Bond—	per cwt.	
	20 lb.	16 lb.
Air dry, watermarked	12.75	13.70
No. 1 (M.F.) watermarked	9.00	9.70
No. 2 (M.F.) watermarked	8.25	8.85
Plain (M.F.) unwatermarked	7.60	8.20

Sulphite Ledger—	per cwt.
	Zone 1
No. 1 (M.F.) watermarked	10.00
No. 2 (M.F.) watermarked	9.25
Plain (M.F.) unwatermarked	8.60

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleached (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleached (25 lb. up)	11.00 to 11.50
Unbleached (25 lb. up)	10.00 to 10.50

News—OPA Ceilings—	per ton
Rolls, Standard (Contract)	67.00
Rolls (Spot)	(Nominal)
Sheets	75.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.20
White, No. 2	.90 to 1.00
Bleached Anti-Tarnish	1.15 to 1.20
Colored	—
Anti-Tarnish Kraft	.70–
Manila	.90 to .95
Napkins, semi-crepe (12¾ lb. to M shts.) per ea.	.60–
Napkins, full crepe and emb'ssed (12¾ lb to M shts.) per ea.	.60–
Toilet, Bleached (M shts.) per ea.	5.65
Toilet, Unbleached (M shts.) per ea.	4.25–

Towels—	per case
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05

Wrappings (Kraft)	per cwt.
Super-Standard	5.25 to 7.05
No. 1 Wrapping	5.00 to 7.40
Standard Wrapping	4.75 to 7.15
Standard Bag	4.37½
Variety Bag	4.62½–

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	6.00 to 6.25
Steam Finish, 50 lb.	5.00 to 5.25
Water Finish, 50 lb.	5.50 to 5.75

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	6.00 to 6.50
Envy. Mla., Sub. 16-28 (No. 2)	5.75 to 6.00
Envy. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	

Wrapp. Mla. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00

M.G. Sulphite and Kraft (other than Waxing)	
Grade B-20 lb.	6.75 to 7.00
Grade A-22 lb.	7.30 to 7.40

ROGERS "NT" KNIFE GRINDER

5 SIZES
for knives up to
48", 72", 90", 110", 134"

NEVER A DULL KNIFE
Never a Dull Moment

Sturdy Rogers "NT" cabinet base grinders are precision built by the pioneers of the industry for precision grinding. Extra wide "V" ways permit heavier grinding pressure and faster feed. An unskilled operator can easily and safely return knives to action, sharp and true, assuring keen, accurate cutting at low grinding costs. Knives last longer when kept ROGERS SHARP right in your own mill.

Write for Circular "NT"

SAMUEL C. ROGERS & Company

165 Dutton Ave. Buffalo 11, N. Y.

PRECISION QUALITY ROGERS KNIFE GRINDERS SINCE 1887

GIVE YOUR BEATERS A TONIC!

Add Magnus Beatex to your beaters and look for these improvements in your stock:

1—Reduced beating time. Less jordanning.

2—A better web, due to more uniformly defibred and hydrated stock.

3—Improved freeness. Less compacted paper. Better interlacing of fibres with improved retention of short fibres and fillers. Dryer stock at press rolls.

4—Greatly improved dispersion of wax and other foreign elements from furnish. Ability to use more low-cost furnish on some stocks.

5—Less slime troubles. Beatex tends to disperse incipient slime formations.

6—Marked improvement in absorbency on such papers as sanitary napkins, diapers, cleaning tissue towelling and blotting. A softer and more readily formed fruit wrap stock.

If you make board or roofing stock, kraft and other hard stocks, fruit wrap or any absorbent papers, make a thorough investigation of Magnus Beatex.

1921-1946 TWENTY-FIVE YEARS OF SERVICE TO INDUSTRY

MAGNUS CHEMICAL CO., 192 SOUTH AVE., GARWOOD, N. J.

MAGNUS Paper Mill Cleaners

RYERSON STEEL

IN STOCK for prompt shipment—Call your nearest Ryerson dealer.

Partial list of Ryerson products:

Alloy Steels	Boiler Fittings	Threaded Rods
Bars—Shapes	Reinforcing	Rivets—Nuts
Structurals	Floor Plate	Chain—Wire
Rails—Plates	Tool Steel	Tubing
Sheets—Strip	Large stocks in a complete range of sizes and analyses. Write for a current Ryerson Stock List.	
Shafting—Bolts		
Stainless		

Ryertex Bearings Laminated Plastic

Ideal for suction box covers, suction pipe covers, forming boards, doctor blades, and all types of water, oil or grease lubricated bearings. Write for details on any specific bearing application.

Joseph T. Ryerson & Son, Inc., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

Papermakers Attention!

8 publications that you can really use!

Modern Pulp and Paper Making $6.75
G. S. Witham, Sr.
Second Edition, Revised and Enlarged. A book of 704 pages, written for machine tenders, beater men, and other practical mill workers, as well as for engineers, technologists, and executives.

Trouble on the Paper Machine ..... .75
Archie McCaffery
A Monograph—published in convenient pocket-sized edition. Bulk rates, in groups of ten or more, 60 cents per copy.

Technology of Papermaking Fibers ..... .50

Pulp Bleaching ..... .50

Lessons in Paper Making — Part 1 ..... .50
Harry Williamson

Lessons in Paper Making — Part 2 ..... .50
Harry Williamson

Drying of Paper on the Machine 1.50
R. M. Baxter

Procedure Handbook of Arc Welding Design and Practice 1.50
Seventh Edition—latest information on all phases of arc welding—1308 pages—1810 illustrations. Standard text in hundreds of schools and colleges. ($2.00 outside U.S.)

Now available, postpaid; mail check with order to

FRITZ PUBLICATIONS, INC.
39 East Van Buren Street, Chicago 5, Ill.

WATERBURY FELTS

are made by

H. Waterbury & Sons Co.

Oriskany, New York

HARDY S. FERGUSON & COMPANY

CONSULTING ENGINEERS

200 FIFTH AVENUE **NEW YORK 10, N. Y.**

Hardy S. Ferguson—Member *A.S.C.E. A.S.M.E. E.I.C.*
Moses H. Teaze—Member *A.S.C.E A.S.M.E. E.I.C.*

Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

- ***PULP AND PAPER MILLS***
- ***AND OTHER INDUSTRIAL PLANTS***
- ***STEAM AND HYDRO-ELECTRIC POWER PLANTS***
- ***DAMS AND OTHER HYDRAULIC STRUCTURES***

Specify High Capacity

PHILCO STORAGE BATTERIES *FOR YOUR ELECTRIC INDUSTRIAL TRUCKS*

WANTED—Chief Draftsman—must be experienced on pulp and paper mill machinery. To take complete charge of drafting room. Give full particulars in first letter. Address Box 415, Fritz Publications, Inc.

MACHINERY FOR SALE

Complete solid fibre paster up to 4 plys 62" wide with or without paper lining stations; Miehle 46" printers and die cutters; Seybold 28"x38" heated embosser; International window cello. Gluer model CC; 36"&48" rotary printers; Waldron 64" rewinder; 76" Langston and 63" Beloit cut-off knives; 48" Miesel spot sheeter with Erie layboy; 64" Hamblet sheeter. Also coaters, waxers, embossers, paper cutters, printers, gummers, gluers, creasers, scorers, trimmers, slitters and rewinders, slotters, die cutters, and stitchers. Write for bulletins listing over 70 paper converting and paper box machinery now available. South Wabash Engineering Co., 2929 S. Wabash Ave., Chicago 16, Ill.

WANTED—Sales Engineer Trainees. Three or four young men to train as sales engineers; ex-servicemen preferred. Must have sales personality, sound character, and engineering degree or its practical equivalent. Applicants should be prepared to receive home-office training for approximately one year before settling in or traveling any section of country. Starting salary commensurate with background and individual ability. Sprout, Waldron & Company, Muncy, Pennsylvania.

Index to Advertisers

When writing them, please mention The Paper Industry and Paper World
Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

Allis-Chalmers Mfg. Co. 502, 503
American Car & Foundry Co..... 489
American Cyanamid & Chemical Corporation .....
American Defibrator, Inc.....
American Hoist & Derrick Co..... 492
American Paper Machinery & Engr. Works, Inc.....
American Resinous Chemicals Corp...
Appleton Machine Co., The..... 514
Appleton Wire Works, Inc.....
Appleton Woolen Mills..... 573
Armour and Company.....
Armstrong Machine Works.....
Asten-Hill Mfg. Co.....
Atkins and Company, E. C..... 583
Atlantic Steel Co. 575
Aurand Mfg. & Equipment Co..... 577
Aurora Pump Company..... 582

Bagley & Sewall Co., The..... 569
Bailey Meter Company..... 521
Baldwin-Duckworth Div. of Chain Belt Company.....
Bauer Bros. Co., The..... 585
Becco Sales Corporation.....
Beloit Iron Works..... 457
Binney & Smith Co..... 581
Bird Machine Company..... 496
Birk & Choporis..... 587
Black-Clawson Co., The..... 516
Bowser, Incorporated..... 587
Bowsher Co., The N. P..... 597
Brown Instrument Co., The.....
Buffalo Forge Company.....
Buffalo Pumps, Inc.....

Calco Chemical Division, American Cyanamid Company.....
Cambridge Instrument Co., Inc.....
Cameron Machine Co..... 589
Carbonite Metal Co., Ltd..... 585
Carthage Machine Co.....
Cash Company, A. W..... 591
Chain Belt Company.....
Chamberlain Engineering Corp.....
Chemipulp Process, Inc..... 595
Chicago Bridge & Iron Co..... 473
Chicago Electric Company..... 574
Chromium Corp. of America..... 510
Clark Tructractor Division of Clark Equipment Company..... 478
Classified Advertising..... 600
Clayton Manufacturing Co..... 482
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.....
Columbia Chemical Division..... 481
Columbian Carbon Company..... 591
Columbian Carbon Company, Magnectic Pigment Division.....
Cooper Alloy Foundry Co., The..... 501
Crane Co..... 507

Darnell Corporation, Ltd..... 590
Davis and Thompson Co..... 572
De Laval Steam Turbine Co..... 488
DeZurik Shower Company..... 587
Diamond Alkali Company..... 509
Ditts Machine Works..... 516
Dodge Manufacturing Corporation....
Dow Chemical Co., The.....
Downingtown Mfg. Co.....1st Cover
Draper Brothers Company..... 517
Dresser Industries, Inc.....
du Pont de Nemours & Co., E. I.....
Duriron Co., Inc., The.....

Eastern Stainless Steel Corp.....
Eastwood-Nealley Corporation..... 568
Economy Co., Inc.....
Electric Machinery Mfg. Co.....
Electric Steel Foundry..... 458
Elwell-Parker Electric Co., The.....
English China Clays Sales Corp..... 578

Fairbanks, Morse & Co.....
Falk Corporation, The.....
Falls Chemical Products Co..... 593
Ferguson & Co., Hardy S..... 600
Fitchburg Screen Plate Co., Inc..... 579
Fleishel Lumber Company.....
Flexible Steel Lacing Co.....
Flori Pipe Company..... 504
Foxboro Company, The..... 485
Fritz Publications, Inc.....600, 602

Garlock Packing Co., The..... 583
Gates Rubber Company..... 543
General American Transporation Corporation 506
General Chemical Company..... 505
General Electric Company.....
Glidden Company, The.....
Goslin-Birmingham Mfg. Co., Inc. .....2nd Cover
Goulds Pumps, Inc..... 519
Grinnell Company, Inc.....
Groch Engineering Co.....
Gruendler Crusher & Pulverizer Co...

Hanchett Manufacturing Co..... 570
Hardy, George F..... 597
Harper Company, The H. M.....
Harrington & King Perforating Co.... 587
Harris-Seybold Company..... 479
Hermann Mfg. Co., The.....
Hooker Electrochemical Co..... 482
Hooper & Sons Co., Wm. E..... 493
Hudson-Sharp Machine Company.... 579
Hunt Machine Co., Rodney.....
Huyck & Sons, F. C.....
Hyster Company.....

Improved Paper Machinery Corp.....
Ingersoll-Rand Company.....
Ingersoll Steel & Disc. Div., Borg-Warner Corporation.....
International Nickel Co., Inc..... 545

Jeffrey Mfg. Co., The.....
Jenkins Bros.....
Johnson Corporation, The..... 593
Jones & Sons Company, E. D..... 593
Jones Foundry & Machine Co., W. A. 589

Kalamazoo Tank & Silo Co..... 595
Kalamazoo Vegetable Parchment Co.
Kelco Company..... 485
Kohler System Co., The..... 548
Koppers Company, Inc., Bartlett-Hayward Division.....

Langston Co., Samuel C.....3rd Cover
Layne & Bowler, Inc..... 550
Lewellen Manufacturing Co..... 581
Lindsay Wire Weaving Co., The..... 577
Link-Belt Company..... 499
Lockport Felt Company..... 564
Lodding Engineering Corp.....
Lunkenheimer Co., The..... 560

Magnetic Pigment Division, Columbian Carbon Company.....
Magnus Chemical Co., Inc..... 599
Mason-Neilan Regulator Co.....
Mathieson Alkali Works, Inc..... 460
Michigan Steel Casting Co..... 577
Midwest Piping & Supply Co., Inc.....
Miller Wrapping & Sealing Machine Company .....
Minnesota Mining & Mfg. Co..... 464
Monsanto Chemical Company..... 495
Morey Paper Mill Supply Co.....
Morley Co., The..... 459
Mt. Vernon-Woodberry Mills, Inc..... 483
Murray Mfg. Co., D. J..... 595
Nash Engineering Co., The..... 585

National Bearing Division, American Brake Shoe Company..... 467
National Oil Products Co..... 547
National Publishers Assn., Inc.....
National Research Bureau, Inc.....
National Safety Council, Inc..... 566
Naylor Pipe Company..... 666
Nichols Engr. & Research Corp.....
Norma-Hoffmann Bearings Corp..... 573
Northern Engineering Works..... 470
Northwest Engineering Co.....
Norton Company..... 511
Norwood Engineering Co., The.....

Oakite Products, Inc..... 587
Ohio Injector Co., The.....
Oliver United Filters, Inc..... 471
Orr Felt & Blanket Co., The..... 575
Orton Crane & Shovel Co.....
Owen Bucket Company, The..... 463

Paper & Industrial Appliances, Inc....
Paper Makers Chemical Dept. of Hercules Powder Company.....468, 469
Patterson Foundry & Mach. Co.....
Peerless Pump Div., Food Machinery Corporation 579
Perkins & Son, Inc., B. F..... 518
Permutit Company, The..... 553
Philco Corporation..... 600
Pittsburgh Piping & Equipment Co.... 513
Pittsburgh Plate Glass Co., Columbia Chemical Division..... 481
Poole Foundry & Machine Co..... 593
Powell Company, The Wm..... 567
Pusey & Jones Corp., The..... 477

Raymond Service, Inc., Charles P.....
Reed-Prentice Corp..... 466
Reichhold Chemicals, Inc.....
Reliance Electric & Engr. Co..... 487
Research Corporation..... 555
Rogers & Co., Samuel C..... 599
Roofing Machinery Mfg. Co.....
Roots-Connersville Blower Corp.....
Rose Engineering Corp., J. O.....
Ross Engineering Corp., J. O.....
Ryerson & Son, Inc., Joseph T.....522, 600

Sandusky Foundry & Machine Co.... 597
Sandy Hill Iron & Brass Works, The 587
Shartle Bros. Machine Co..... 516
Shuler & Benninghofen..... 559
Smith & Winchester Mfg. Co..... 585
Solvay Sales Corporation..... 581
Spraying Systems Company.....
Sprout, Waldron & Co.....
Standard Oil Co. (Indiana)..... 541
Steamaire Company.....
Stebbins Engr. & Mfg. Co..... 561
Stein, Hall & Company, Inc..... 520
Stickle Steam Specialties Co..... 593
Sutherland Refiner Corporation..... 490
Swenson Evaporator Company.....

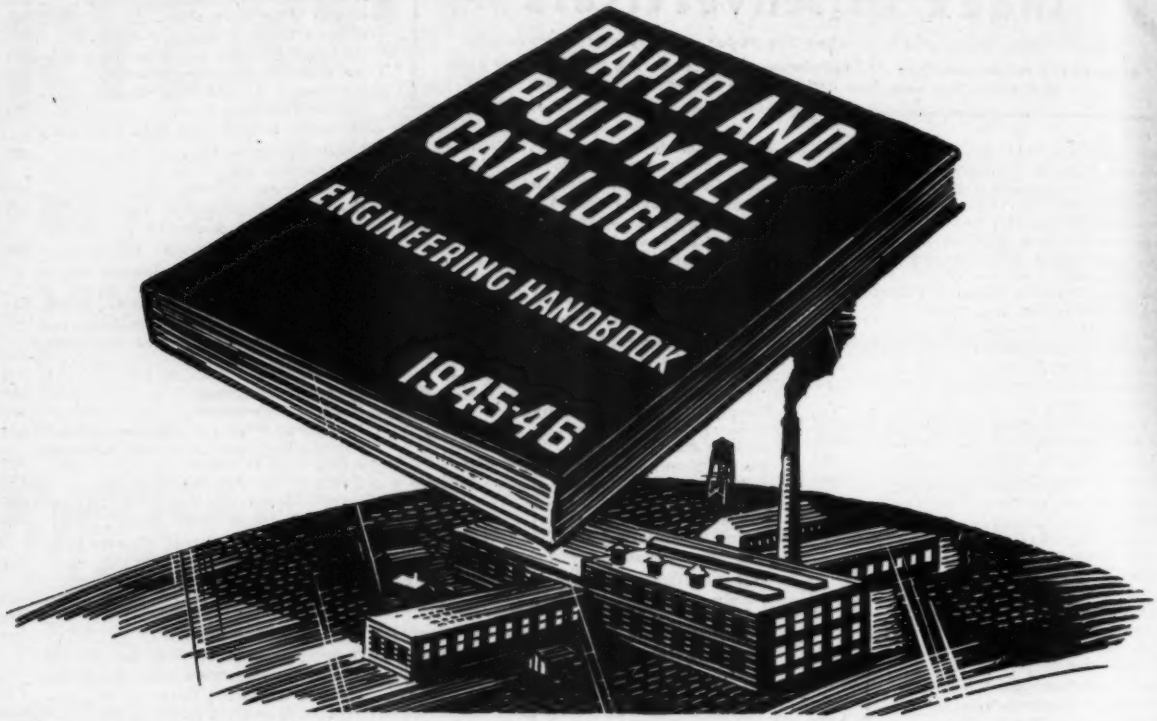
Taylor Forge & Pipe Works.....
Texas Company, The.....4th Cover
Thomas Flexible Coupling Co..... 549
Timken Roller Bearing Co., The.... 491
Titanium Pigment Corporation..... 500
Torrington Co., Bantam Bearings Division 567
Towmotor Corporation..... 515
Trent Tube Manufacturing Co.....
Trimbey Machine Works..... 595
Tube Turns, Inc.....
Turner Halsey Company..... 483

U. S. A. Treasury Dept. .....
Union Pacific Railroad Company..... 508
United States Rubber Company.....
U. S. Stoneware Co..... 517

Valley Iron Works Company..... 494
Vanderbilt Co., Inc., R. T.....

Waldron Corporation, John.....
Warren Steam Pump Co., Inc..... 486
Waterbury & Sons Co., H..... 600
Waterbury Felt Co., The..... 576
Westinghouse Electric Corporation...
Weyerhaeuser Timber Co.....
Whiting Corporation.....
Whittaker, Clark & Daniels, Inc..... 512
Wilkens-Anderson Company.....
Williams and Co., C. K..... 595
Worthington Pump & Machinery Corporation .....
Wyandotte Chemicals Corporation.... 472

Now available at your mill office . . .



ready to serve in the maintenance and operation of your mill. A larger CATALOGUE SECTION with detailed information about the products of the prominent manufacturers that supply the industry. The cross-indexed BUYERS SERVICE SECTION to help you locate sources of purchases for machinery, equipment, chemicals and supplies. The ENGINEERS HANDBOOK extended for your use through the addition of a number of charts and tables.

The PAPER AND PULP MILL CATALOGUE has been edited and produced to serve you. Use it frequently—the more you refer to it, the more helpful it will be to you.

These firms describe their products in the 1945-46 edition—

Allington & Curtis Mfg. Co., The
Allis-Chalmers Mfg. Company
American Cyanamid & Chemical Corporation
American Defibrator, Inc.
American Paper Mach'y. & Engr. Works, Inc.
Appleton Machine Co., The
Armour & Company
Armstrong Machine Works
Atkins & Company, E. C.
Aurora Pump Co.
Automatic Transportation Company
Bagley & Sewall Company, The
Bauer Bros. Company, The
Beloit Iron Works
Benjamin Electric Mfg. Co.
Biggs Boiler Works Company, The
Bird Machine Company
Black-Clawson Co., The
Blaw-Knox Division (Blaw-Knox Company)
Blickman, Inc., S.
Bowser, Incorporated
Buffalo Forge Company
Buffalo Pumps, Inc.
Bufovak Equipment Division (Blaw-Knox Company)
Cameron Machine Company
Carthage Machine Company
Cash Company, A. W.
Chemipulp Process, Inc.
Chicago Bridge & Iron Company
Chicago Electric Company
Clark-Aiken Company, The
Control Equipment Corporation
Covel-Hanchett Company
DeZurik Shower Company
Dilts Machine Works
Dow Chemical Company, The
Downingtown Manufacturing Co.
Dresser Industries, Inc.
Duriron Company, Inc., The
English China Clays Sales Corporation
Falk Corporation, The
Farrel-Birmingham Company, Inc.
Fitchburg Screen Plate Company, Inc.
Fleischel Lumber Company
Foster Wheeler Corporation
Fuller Brush Company
Garlock Packing Company, The
General American Transportation Corporation
Glens Falls Machine Works, Inc.
Glidden Company, The
Golden-Anderson Valve Specialty Company
Goslin-Birmingham Manufacturing Co., Inc.
Graver Tank & Mfg. Co., Inc.
Gruendler Crusher & Pulverizer Co.
Harper Company, The H. M.,
Harris-Seybold-Potter Co.
Hauser-Stander Tank Co.
Hercules Powder Company, Inc.
Hermann Manufacturing Co., The
Hewitt Machine Company, Inc., J. W.
Hills-McCanna Co.
Holyoke Machine Company
Hooker Electrochemical Company
Improved Paper Machinery Corporation
Industrial Gear Mfg. Co.
Indico Inc.
James Manufacturing Co., D. O.
Jeffrey Manufacturing Co., The
Johns-Manville
Johnson & Carlson
Johnson Corporation, The
Jones & Sons Company, E. D.
Jones Foundry & Machine Co., W. A.
Kalamazoo Tank & Silo Company
Kohler System Company, The
Lancaster Iron Works, Inc.
Langston Company, Samuel M.
Lawrence Machine & Pump Corporation
Leader Iron Works, Inc.
Link-Belt Company
Lovejoy Flexible Coupling Co.
Market Forge Company
Mason-Neilan Regulator Co.
Maxson Automatic Machinery Company
Meisel Press Manufacturing Company
Merrick Scale Mfg. Co.
Michigan Pipe Company
Monsanto Chemical Company
Morris Machine Works
Moyno Pump Div., Robbins & Myers, Inc.
Murray Manufacturing Co., D. J.
National Aluminate Corporation
National Casein Sales
Naylor Pipe Company
Nekoosa Foundry & Machine Works, Inc.
Nichols Engineering & Research Corp.
Noble & Wood Machine Co., The
Norma-Hoffmann Bearings Corporation
Northern Engineering Works
Norwood Engineering Company, The
Ohio Grease Company, The
Oliver United Filters, Inc.
Paper & Industrial Appliances, Inc.
Paper Makers Chemical Department (Hercules Powder Co., Inc.)
Pennsylvania Salt Manufacturing Co.
Perkins & Son, Inc., B. F.
Pittsburgh Piping & Equipment Co.
Porter Company, Inc., H. K.
Pusey & Jones Corporation, The
Record Foundry & Machine Company
Reichhold Chemicals, Inc.
Robbins & Myers, Inc.
Rollway Bearing Company, Inc.
Roots-Connersville Blower Corp.
Ross Engineering Corporation, J. O.
Sandusky Foundry & Machine Co.
Sandy Hill Iron & Brass Works, The
Schutte & Koerting Company
Seybold Division, Harris-Seybold-Potter Co.
Shartle Bros. Machine Co.
Simonds Worden White Co.
Simpson Company, The Orville
Sinclair Company, The
Solvay Sales Corporation
Stainless Steel Division, Pittsburgh Piping & Equipment Co.
Stebbins Engineering & Manufacturing Company
Stein-Hall
Sullivan Machinery Company
Swenson Evaporator Company
Taylor Forge & Pipe Company
Toledo Scale Company
Trimbey Machine Works
Tube Turns, Inc.
Twin Disc Clutch Company
Union Machine Company
Union Screen Plate Co.
Valley Iron Works Company
Waldron Corporation, John
Wallace & Tiernan Co., Inc.
Warren Steam Pump Company, Inc.
Westinghouse Electric Corporation
Whiting Corporation

Please mention the PAPER AND PULP MILL CATALOGUE when making inquiries.

FRITZ PUBLICATIONS, Inc. 59 East Van Buren Street CHICAGO, ILLINOIS

Successful Combinations

EAGLE-A

PAPERS

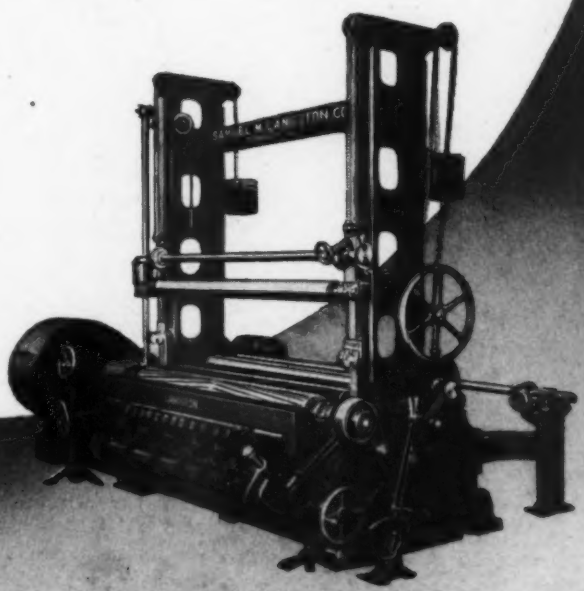
Oh, nature's noblest gift, my gray goose-quill!—BYRON.

The poet praised his quill—but without *paper* his message would have perished. Just as pen and paper are interdependent, so are production *know-how* and the machines that are part of the processing.

American Writing Paper Corporation, whose Eagle-A Papers are so widely known, is another in the long list of prominent firms using Langston Slitters and Roll Winders.

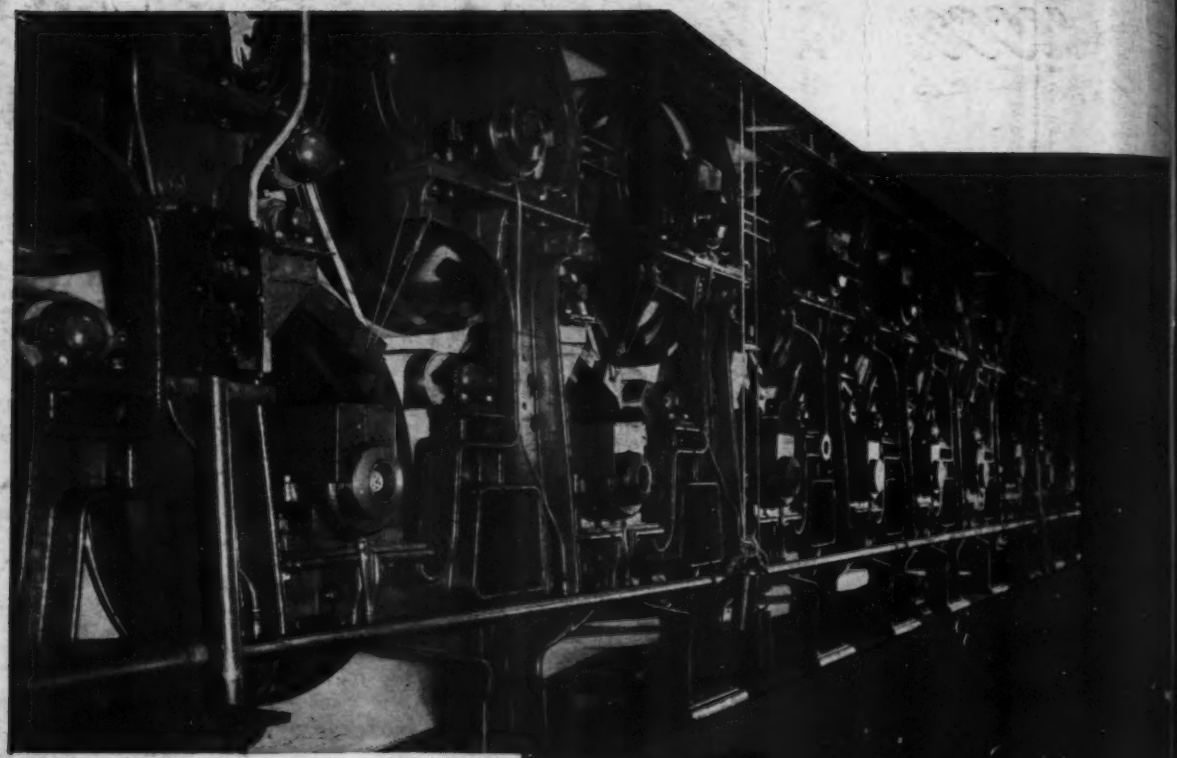
Here, as with many other products, Langston's are doing a good job in the process of making fine paper. There is a type and size to meet every need.

SAMUEL M. LANGSTON COMPANY
CAMDEN, NEW JERSEY



Langston

SLITTERS AND ROLL WINDERS ★



Positive P... Co...

You can run dryer rolls faster and hotter — assure continuous, trouble-free operation — by giving bearings the positive protection of Texaco.

Texaco Oils for paper machines resist oxidation and sludging even under high temperatures and heavy pressures. They keep circulating systems clean and open — assure a continuous flow of cool, uncontaminated oil to all bearings. Thus, bearings run cooler, last longer, need less servicing. They prevent rust formation on costly machine parts and do not foam. Expensive "clean up" of the oil system is practically eliminated.

These benefits explain why Texaco Oils are used by pulp and paper mill operators throughout the country. Use them in *your* mill.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS